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ECODRIVE
DKC01.1/DKC11.1 Drive Controllers

Functional Description: ASE 02VRS

DOK-ECODRV-ASE-02VRS**-FKB1-EN-P

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What is the purpose of this documentation?

The following document describes the functions of the fimware FWA-ECODRV-ASE-02VRS-MS.

The document serves:

- to describe all of the functional characteristics.
- for parameterization of the drive controller.
- for data security of the drive parameter
- for error diagnosis and error removal

Change Notice

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1 System Overview

1.1 Ecodrive - the Economical Control Drive for Automation

ECODRIVE is a digital intelligent automation system which provides a cost effective way to control single and multiple axis control tasks.

ECODRIVE can be used to accomplish all kinds of control tasks in different fields. It is typically used in applications such as:

- Handling systems
- Packaging machinery
- Assembly systems

1.2 Ecodrive - a Family of Control Drives

An **ECODRIVE** consists of a drive controller and an MKD-servomotor. There are presently four drive controllers available, each with different control interfaces.

- DKC01.1 with Analog, Stepper Motor, and Positioning interfaces
- DKC11.1 with Analog interface
- DKC02.1 with SERCOS interface
- DKC03.1 with PROFIBUS-DP interface

The instructions for the DKC01.1 and the DKC11.1 are described in the following section. The DKC02.1 and DKC03.1 have their own documentation.

1.3 Overview of DKC01.1/DKC11.1 Functions

DKC01.1 - Modes of Operation

Servo Drive with Integrated Positioning Control

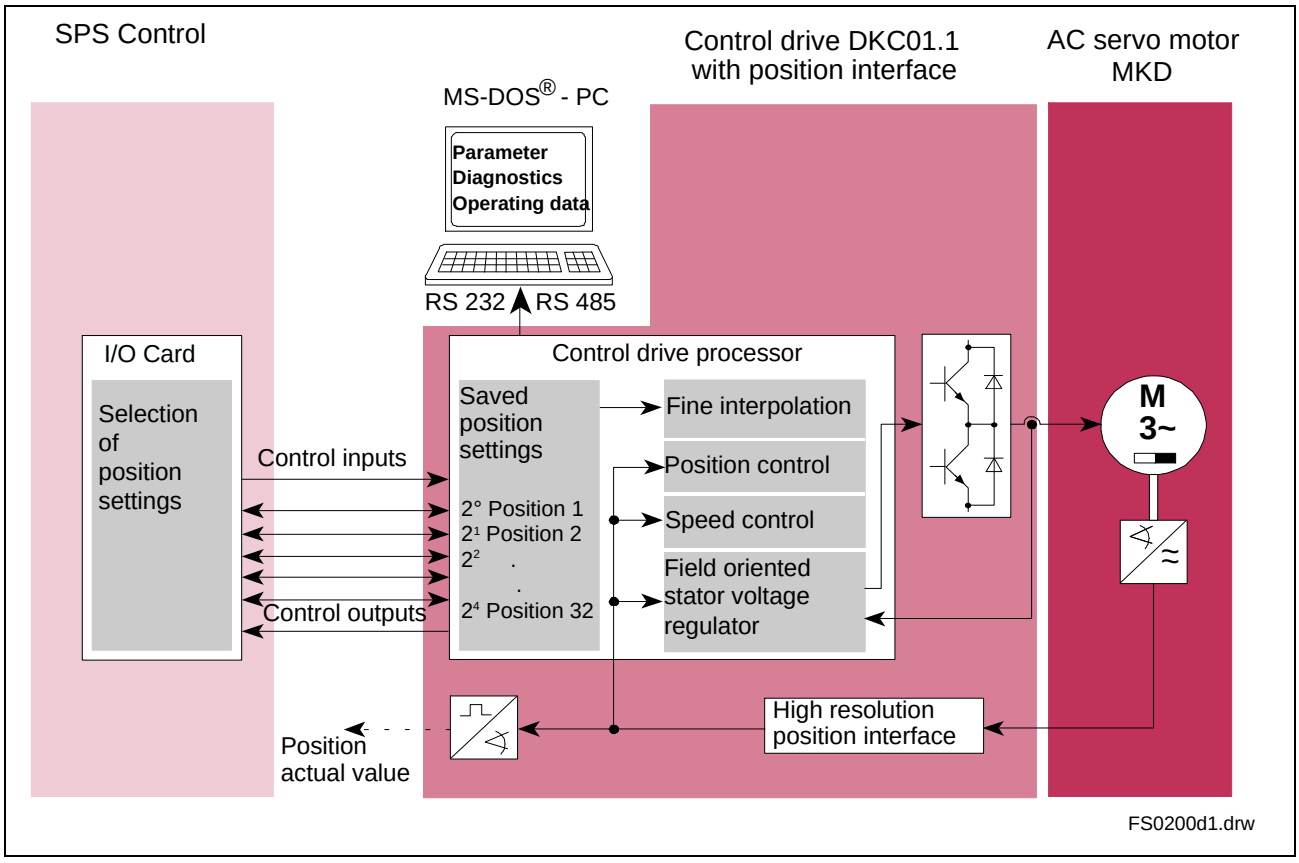


Figure 1-1: Servo drive with integrated positioning control

- Up to 32 position settings can be stored in the DKC01.1 and DKC11.1. These settings can be selected via parallel inputs. The DKC01.1 executes position settings independently.
- The drive controller can conform to mechanical transmission elements such as gear ratios or feed constants.
- All position, speed, and acceleration data can be weighted rotary or linear depending on the the axial kinetics.
- An internal homing procedure can help create a reference position.
- The axis can be controlled via the jog function for set-up operation.
- The positioning speed can be influenced with the Feedrate Override.
- Limit switch inputs and parametrical position limits are available to set travel range limits.
- The drive controller status can be determined via status outputs.

Servo Drive with Analog Velocity Interface and Integrated Actual Position Value Register

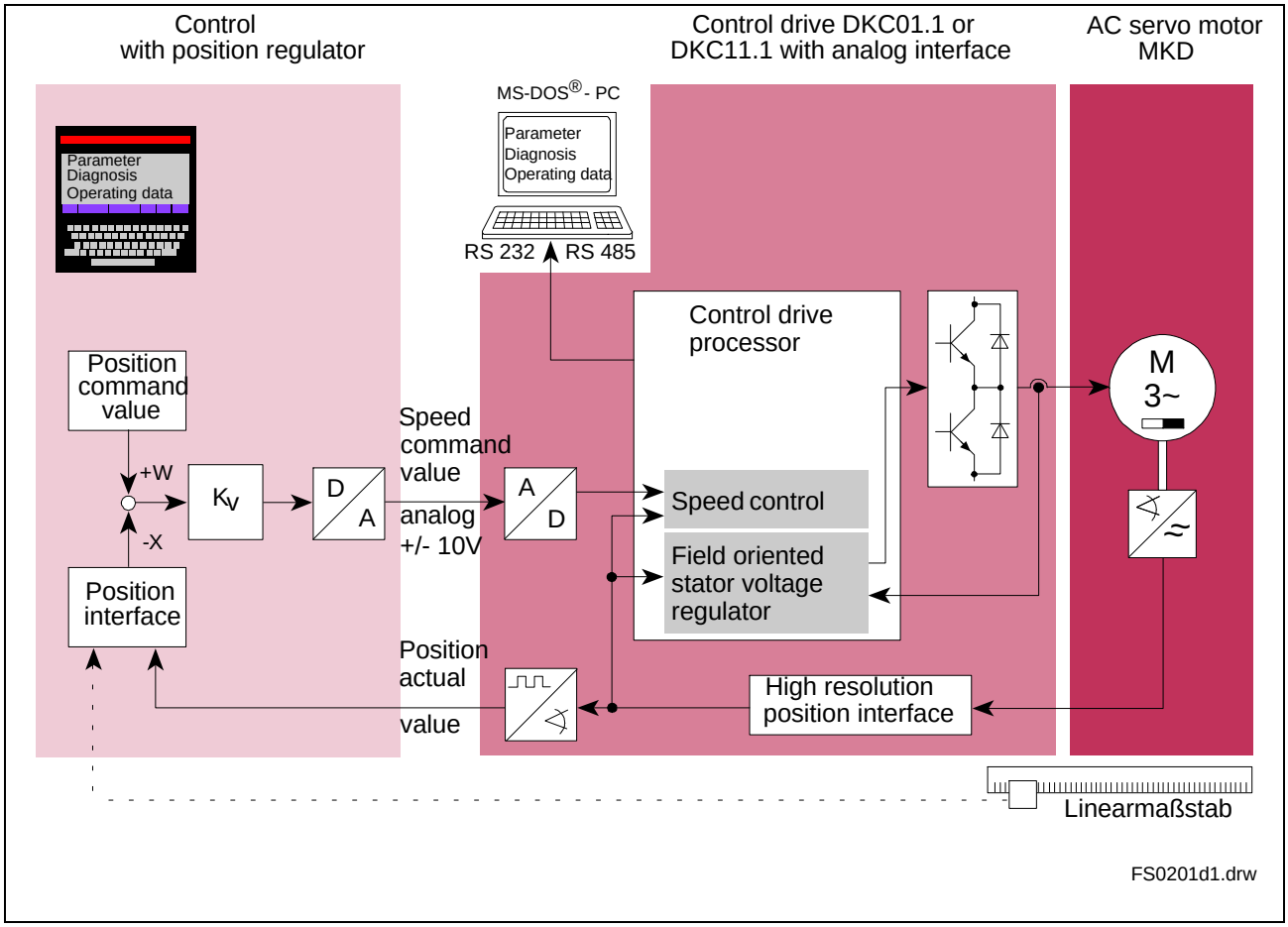


Figure 1-2: Servo drive with analog velocity interface and integrated actual position value register

- The scaling factor of the analog velocity command value can be set in the DKC.
- The output of the actual position value can be either incremental or absolute.
- Regardless of the command value the drive controller can be brought to a standstill via a logic input and kept drift free under active control.

Servo Drive with Stepping Motor Interface

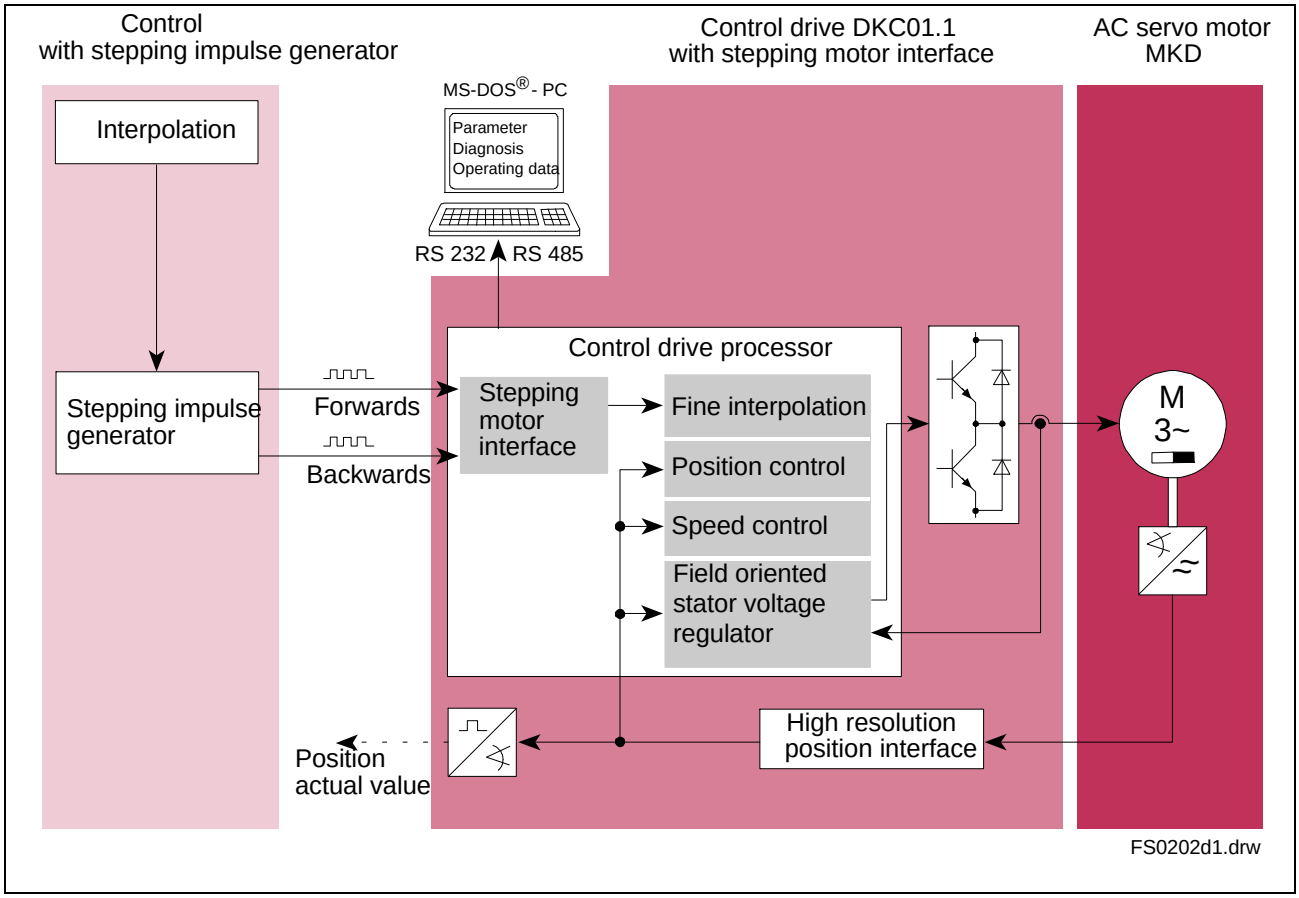


Figure 1-3: Servo drive with stepping motor interface

- The number of steps per rotor revolution is freely adjustable between 16 and 65536.
- The maximum stepping frequency is independant of the load. Because the position of operation is monitored, it is technically impossible for steps to be "left out".
- The Stepper Motor interface can be set to three standard signal definitions to enable trading signals between control and drive controller systems.
  - Quadrature signals
  - Forward/backward signals
  - Step and direction signals
- An internal homing procedure can help create a reference position.
- The axis can be controlled via the jog function for set-up operation.
- The homing and jogging speeds can be influenced via the Feedrate Override.
- Limit switch inputs and parametrical position limits are available to set travel range limits.
- The drive controller status can be determined via status outputs.

DKC01.1/DKC11.1 General Characteristics

Direct Power Supply Connection

The drive controller can be connected directly to single and three phase 230V power supplies or three phase power supplies ranging from 380V to 480V without transformers. A power rectifier, intermediate circuit capacitor, and bleeder are included as standard equipment.

Integrated Brake Activation

The optional brake in MKD motors is activated directly via the drive controller.

Actual Position Value Measurement

ECODRIVE measures the actual position value via the motor feedback system

- **Incremental position measurement (standard)**
  The actual position value will be set at a random value when the power supply is first turned on. To give the actual position value a fixed reference point, the reference point must be set with a defined homing procedure.
- **Absolute position measurement (optional)**
  After the power supply has been turned on, the absolute actual position value in relation to a fixed reference point is immediately available. Thus, completing the homing procedure is unnecessary.

Actual Position Value Output

The DKCO1.1 has an actual position value output for transmission of the actual position value to an NC control. Actual position values can be transmitted in either incremental or absolute format.

- **Incremental Actual Position Value Output**
  5V-TTL incremental encoder signals with an adjustable counter are given as an output. Incremental actual position value output is possible with both actual position value and absolute actual position value acquisition.
- **Absolute Actual Position Value Output**
  The absolute actual position value is transmitted in the standard SSI-format for position encoders. The output of the absolute actual position value is only possible when using a motor with an absolute encoder (optional).

Integrated Diagnostic Display

All internal condition and error analysis is displayed via a dual position seven segment display.

Easy Installation

The installation and diagnostic program DRIVETOP helps with a user-friendly installation via the serial RS-232 interface on a PC running Windows ™ 3.1.

Functional Differences between DKC01.1 and DKC11.1

The DKC11.1 is a DKC01.1 with reduced operating features. The essential differences are shown in the following tables.

Type of Operation	DKC01.1	DKC11.1
Position control with position interface	X	
Position control with stepping motor interface	X	
Velocity control with analog interface	X	X
Torque control with analog interface	X	X

Figure 1-4: Overview:Types of operation available with DKC01.1 / DKC11.1

Function	DKC01.1	DKC11.1
Transversing range limits via limit switch	X	
Position regulator loop monitoring	X	
Status messages (INPOS, INBWG, INREF)	X	
Positional forward break-over point function	X	
Control drive guided homing	X	
Jogging	X	
Override function for jogging, positioning, and homing	X	
Actual position output (Incremental or absolute)	X	X
Built-in error reaction	X	X
Velocity regulator loop monitoring	X	X
Analog diagnostic outputs	X	X
Built-in control of the motor brake	X	X
Drift-free standstill of the drive via the stop-drive-function	X	X

Figure 1-5: Overview:Functions available with the DKC01.1 / DKC11.1

2 Safety Instructions for Electrical Drive Controller

2.1 General Information

- The safety information in this user's manual must be fundementally followed.
- Improper use of this device and disregard of the given warnings can lead to damaging the device, injury, or death (in the extreme case).
- In case of damage due to neglecting the warnings in this user's manual, INDRAMAT GmbH does not assume any liability.
- If the documentation in the following manual can not be understood, one can request documentation in another language before proceeding with the startup procedure.
- The accurate and safe operation of this device requires proper transport, storage, assembly and installation as well as careful sevicing and maintenance.
- Use replacement parts only from the manufacturer.
- Follow the saftey instructions and specifications for the operations stated.
- The devices are installed in machines that will be used for industrial applications.
- Initial operation is prohibited until it is shown that the machine in which the device is installed complies with EG Standard 89/ 392/ EWG (machine standard).
- Operation is allowed only through observance of the national EMV instructions for the following applications. In the EU, the EMV standard 89/ 336/ EWG is required.
- The technical data, connection requirements and the installation requirements are found within the user's manual and must be followed.

Qualified Personnel:

- Only qualified personnel should work on this device or work within the area of this device.
- A person is qualified if they are sufficiently experienced with assembly, installation and operation of the product as well as all the warnings and precautions according to the user's manual.
- Furthermore, it is explained how to turn on and off, ground and designate the service circuit and devices in accordance with safety techniques. The drive controller contains safety functions that are triggered at the time of fault conditions.

2.2 Protection against Contact with Electrical Components

Explanation:

The voltage across some electrical parts will be larger than 50 volts which can be dangerous. During operation of electrical devices, there are guided motion parts which have dangerous voltage across them.

Danger

High voltage !

Life threatening or bodily harm

⇒ The general assembly and safety instructions must be followed when working in high voltage area.

⇒ After the installation of the drive controller to all the electrical devices, one should re-check the connection schematic.

⇒ An operation is only allowed with a insulated wire connected to predescribed points of a component(also for test measurements).

⇒ Before servicing electrical components with a voltage higher than 50 volts, disconnect the device from the power source. Also protect against the device being turned back on prematurely.

⇒ Wait for 5 minutes after the device has been turned off to handle the device so that the capacitors can completely discharge.

⇒ Do not touch the electrical connector plugs of the components while the device is on.

⇒ Cover the parts of the device which have a voltage across them before the device is turned on in order to avoid them being touched.

⇒ An FI circuit breaker(earth leakage circuit breaker) can not be inserted using an AC input.The protection against indirect touching must be produced through other ways, for example through an overload circuit breaker (according to EN 501787/ 1994 Section 5.3.2.3).

⇒ For flush mounting instruments, the protection against indirect contact of an electrical part can be made through an outer case, for example a switch gear cabinet(according to EN 501787/ 1994).

Danger

High Leakage Current
Possible Results
Life threatening or bodily harm

⇒ Before turning on the device, all components and the motor must be grounded or connected to ground points by insulated wires.

⇒ The leakage current is larger than 3,5 mA.It is required, therefore, that the device has a fastened connection on the main power supply.(EN 50178/ 1994 Section 5.12.11.1).

⇒ Before initial operation or testing operations, connect the drive system to ground.The outer case can have a voltage across it if not grounded.

2.3 Protection from the Safe and Seperated Low Voltages

Explanation:

The voltages on the power components which are found on the connections and the interface for signal voltages are in the voltage range of 5 to 30 volts and are within securely seperated circuits.

Warning

High voltage through false connection
Possible Results
Life threatening or bodily harm

⇒ The signal voltage connection and interface of this device may only be connected to apparatuses, electrical components or wires which exhibit a sufficient safe seperation from the active circuit according to standard IEC 364-4-41, 413.5 or according to DIN EN 50178, 12.94, Secion 5.2.18.

2.4 Protection from Dangerous Movements

Explanation:

Dangerous movements can be produced through mistakes in the control of the connected motors.

The causes can be different types:

- Errors in the software
- Production errors in the components
- Wiring errors
- Errors in the test result and signal transmitter
- Errors in the servicing of the components

These errors can apprear directly after the device is turned on or after unknown time length.

Warning

Dangerous Activity

Possible Results
Life threatening, bodily harm or device damage!

⇒ The drive components monitoring units make mal-operation in the connected drives impossible. In view of operator safety, this fact cannot be relied on alone. An incorrect work movement the size of which depends on the kind of malfunction and the operating status is in any case to be expected before the built-in monitoring units become active. Operator safety is therefore to be ensured by means of monitoring units or measures which are superordinated on the plant side. These are provided according to the specific conditions of the plant after a danger and error analysis by the plant constructor. The safety requirements which apply to the plant are included here.

⇒ The personal safety is ensured through the above mentioned fundementals of control or preventitive measures which must be placed above all else. This will be planned according to specific conditions of the construction after a danger and error analysis from the manufacturer. Those of which pass the accepted safety requirements will be included.

Pay close attention to:

⇒ Keep clear of the machine movement range. Possible measures to prevent people unintentionally accessing the machine are protective fences, protective railings, protective coverings and/or light curtains.

⇒ Sufficient strength of the fencing and covering against the maximum possible motion energy.

⇒ Mount Emergency Stop switch(es) in the immediate vicinity of the operator so it can be easily reached. Check that the Emergency Stop works before start-up.

⇒ Isolate the drive controller power connection via an Emergency Stop circuit or use a safe starting lockout to protect against unintentional start-up.

⇒ Before handling or moving into the dangerous voltage area, bring the control device to a safe standstill. Electrical equipment above the main switch should be kept voltage free and ensured that no power could be turned on again.

- Maintenance Work and Repair
- Cleaning
- before long periods of non-use

⇒ Avoid the operation of high frequency, remote control and audio equipment in the area of the device or its wiring.If the usage of the device is unavoidable before the initial operation of the system and the fail safes of the system can be tested. In these cases of necessity, the EMV Test of construction is necessary.

2.5 Protection during Assembly and Handling

Explanation

Improper handling and assembly of certain power components or use under without following the requirements can lead to injury.

Careful

Possible bodily harm through improper handling!

Injury through pinching, sheering, cutting, trimming

⇒ The general installation and safety instruction must be following during handling and assembly.

⇒ Use suitable assembly and transportation arrangements

⇒ Prevent pinching and squeezing through proper precautions.

⇒ Use only the proper tools.In addition, use only the described special tools.

⇒ Lifting devices and tools should be inserted properly.

⇒ If necessary use appropriate protective equipment (for example protective eyewear, safety shoes, safety gloves).

⇒ Do not stand under hanging freight.

⇒ Clean up all liquids on the floor due to slipping danger.

Notes

3 Preparation for Startup Procedure

3.1 General Instruction for Startup Procedure

In this chapter the initial operation and diagnostic system DriveTop will be introduced. In general it is necessary to install DriveTop on the PC for the commissioning of the DKC to run. Drive Top follows this handbook to run concurrently offline. In the following chapters the document will refer often to this program.

Note: If you would like to see a short summary of the functioning qualities of the **ECODRIVE**, you can jump to chapter 9.

3.2 Drive Top Startup Procedure and Diagnostics

DriveTop is a WINDOWS based application program used in the initial operation and diagnosis of **ECODRIVE** drive controller.

DriveTop has a user friendly start up guide. The intitial operator will be led through a series of functional dialogue for the input of all operational settings. For each of these dialogues there are help instructions that can be activated with the push of a key.

The start up parameterization process is set up so that the user is only confronted with parameter settings that are only relevant to the chosen operating configuration.

3.3 DriveTop-System Requirements

DriveTop is a Windows based application program. The minimum PC requirements are:

- IBM compatable 80386 / 40MHz (80486 recommended)
- 4MB RAM (8MB recommended)
- 5MB free hard drive space for Drive Top and an additional 15 MB for the ECODRIVE help system
- A free serial port
- VGA graphics
- Mouse or compatable pointing instrument
- Windows 3.1

3.4 Installation of DriveTop

DriveTop will be on two (2) 3.5" disks (Dos format;1,44MB)

Note: Please make a backup copy of the Drive Top installation diskettes. Install the software from these copies. Store the original diskettes in a safe place! For installation on your computer, you must use the installation programs on the diskettes. It will not work if you simply copy the diskettes.

Starting the Installation Program

For installation of DriveTop do the following steps:

- Turn on the PC and start Windows
- Place “Diskette 1” in the disk drive
- Activate the Windows Program Manager
- At the menu, click on “FILE“ and choose from the drop down menu “LOAD“.
- At the command prompt type "A:\INSTALL” (if the DriveTop diskette is in drive A:)
- The order of the installation program is as follows:

After successful completion of the installation you will find the new program group icon **INDRAMAT** on your PC. Within this group you will find the DriveTop icon and an icon for the **ECODRIVE** help system.

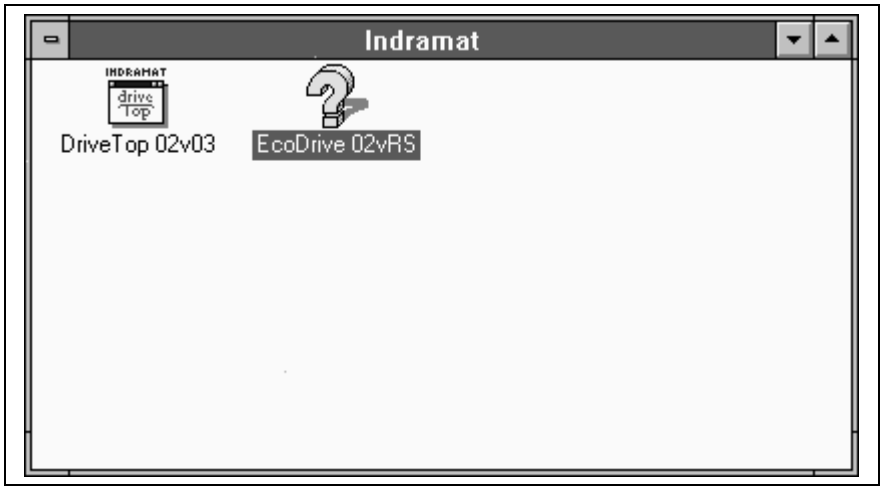


Figure 3-1: INDRAMAT program group with the DriveTop and ECODRIVE Help icons

3.5 Connection of the PCs with the Drive Controller

A serial communication cable is used for the data transfer between the PC and the drive controller. This cable can be purchased from **INDRAMAT** and can be either a 9 pin or 25 pin D-SUB connector. The pin diagram of the cable is shown in the following figure.

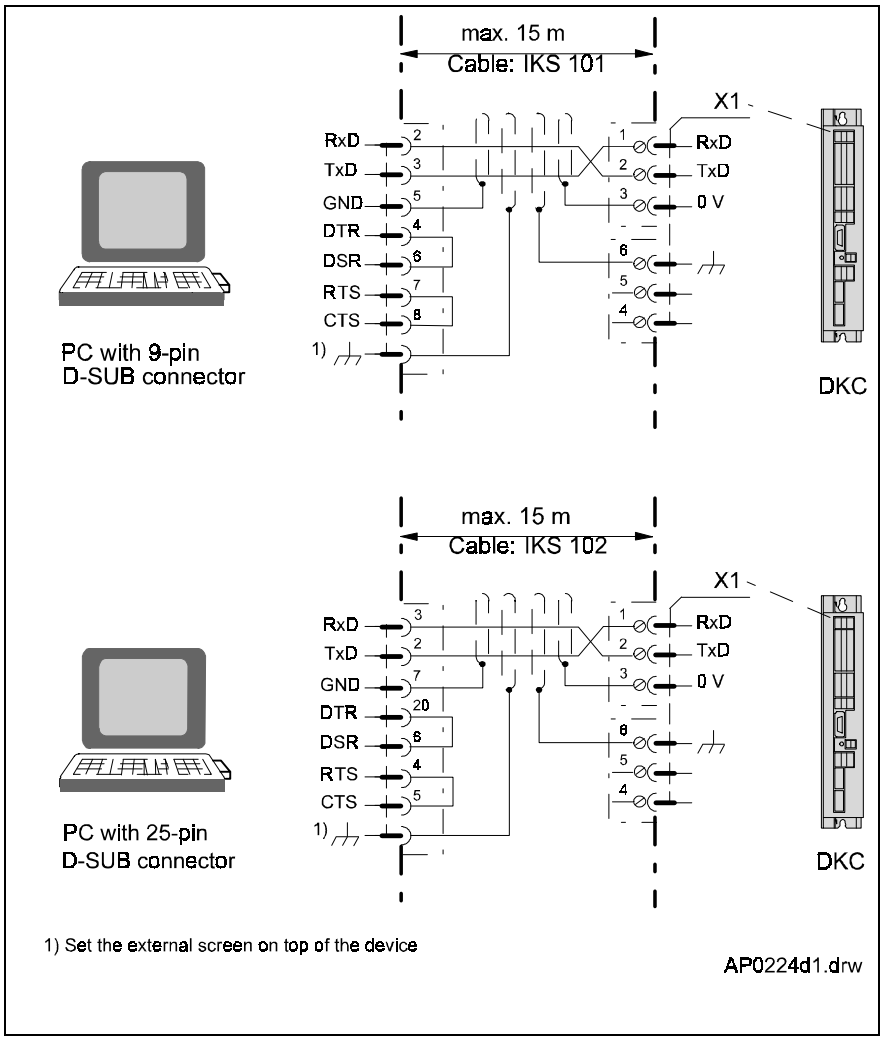


Figure 3-2: Connection of a PC via the RS232-interface on the DKC

Note: Please pay close attention so that the connection of the relative potential (OV/GND) is made to the internal cable shields!

3.6 Minimal Installation for Operation of a DKC with DriveTop

Command for the first parameter setup for a DKC is shown in the following minimal installation.

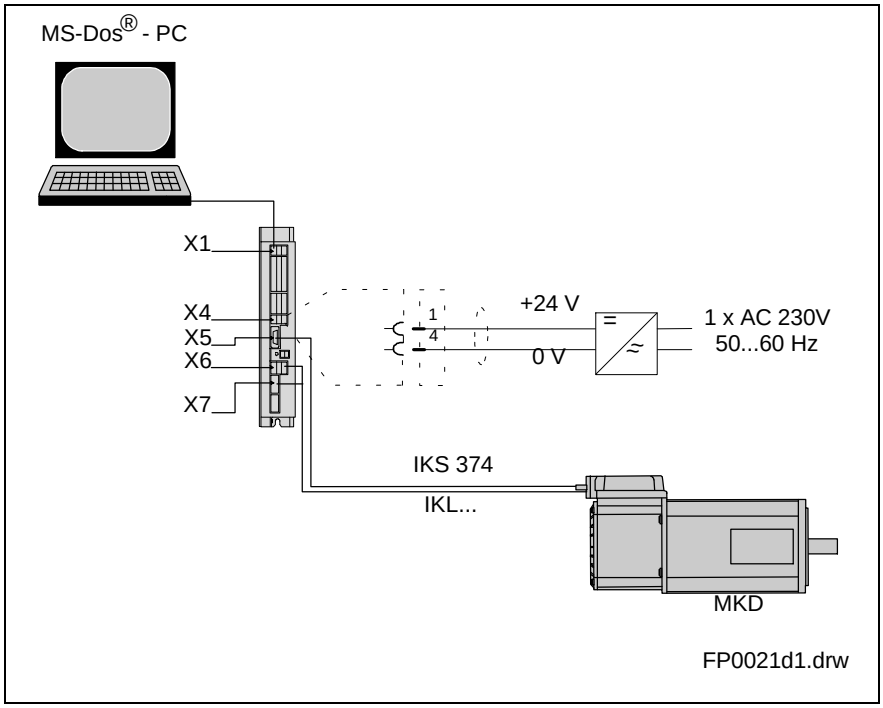


Figure 3-3: Minimal installation for simple parameter setup

With this installation the parameter setup can be easily accomplished. To activate the drive and to carry out motion there are more installations required.

Note: Detailed installation instructions are found in the Project Planning Manual

3.7 DriveTop Start Up

DriveTop can be started by double clicking on the DriveTop icon.

Scanning for Connected Drives

After DriveTop starts running, it searches for connected drives. Thereby every drive address between 1 and 99 will be tested.

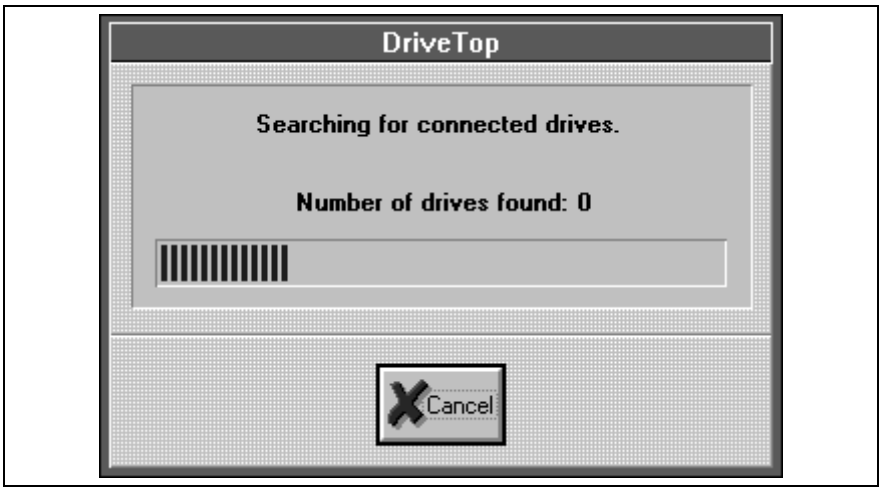


Figure 3-4: Scanning of the drive addresses

If one or more drive controllers are found, the parameter settings from the drive will be classified.

Note: Multiple drives may be found when the PC is connected by an RS232/RS485-interface converter to more drives which are interfaced with an RS485.

If no drive is found then the following dialogue appears:

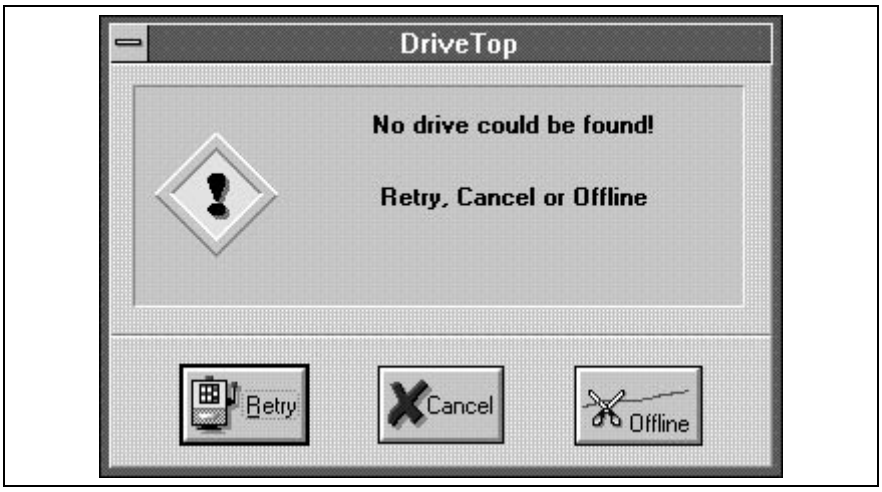


Figure 3-5: Dialogue appearing after failed scan

Reasons for this error can be:

- The +24Vdc control voltage for the DKC is not turned on or not connected.
- Problem in the connection between PC and the drive controller.

Establishing a connection can be retried, the program can be cancelled or you can go in the offline mode.

Online and Offline Operation

Parameter Setup through Online Operation Startup Procedure

Online operation is when a drive controller is in direct communication with the PC via the serial communication link. That means that in online operation, all the parameters that are in the current dialog screen of the start up sequence are written directly to the drive controller and become immediately operative. The user can also immediately test the results of his installation.

Parameter Setup through Offline Operation Startup Procedure

Offline operation means that there is no connection to the drive controller from the PC. The offline operation allows the initial operator a comfortable preparation of the parameter setting which then can be sent completely through a connection to the desired drive controller. There remains only a small amount of work left over for the intial operator which can not be worked through offline because of the dependence of the machine.

Diagnostic Window

After a successful drive controller parameter scan, the following diagnostic window will appear on the PC screen.

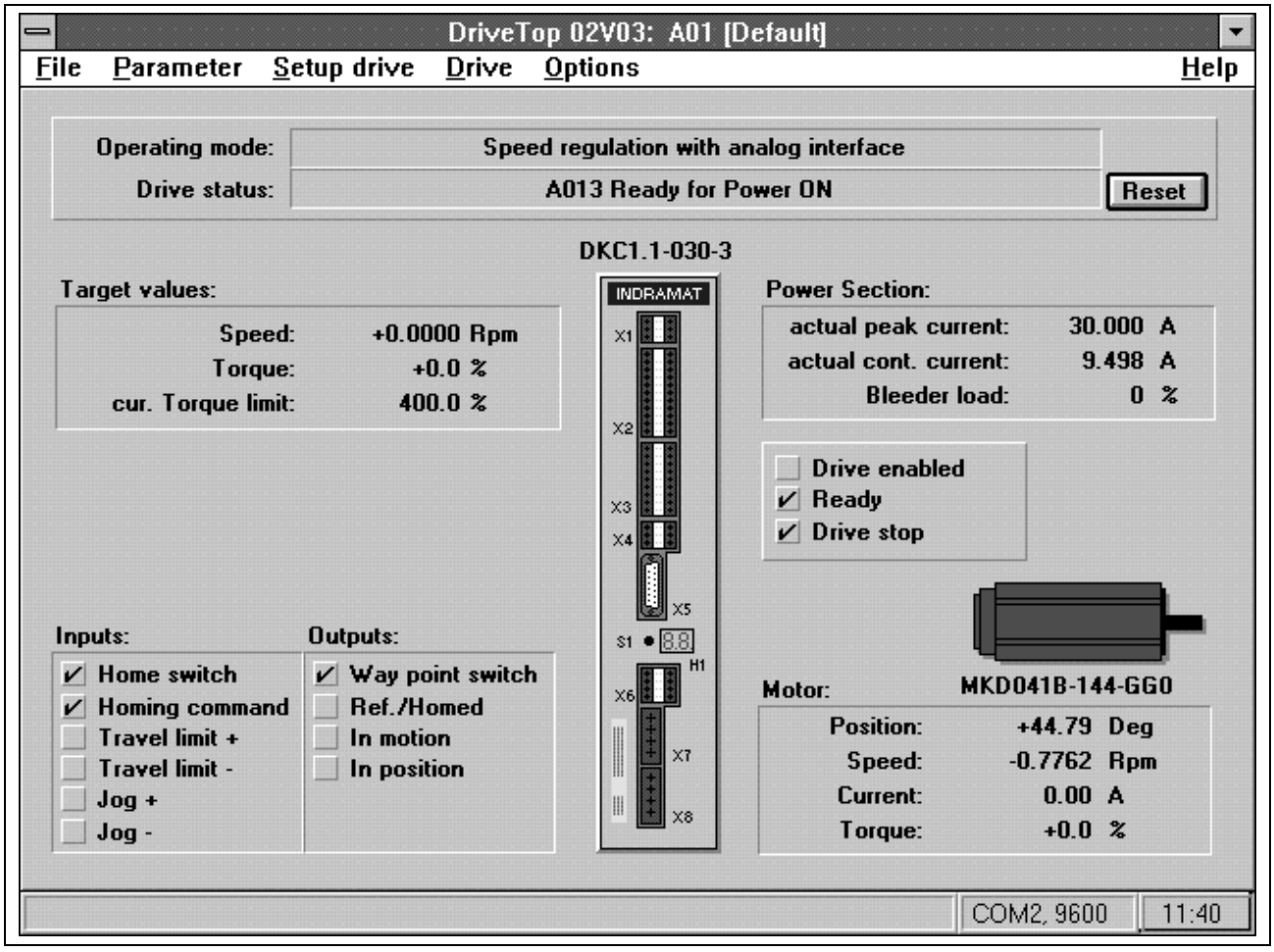


Figure 3-6: Diagnostic Window

The diagnostic window displays the following:

- Drive controller status and error messages
- Command value and actual value
- Power on status and status signals
- Model descriptions of installed components

Instruction: The diagnostic window appears only in online operation. In offline operation, a graphic with the **ECODRIVE** components is shown instead of the diagnostic window.

3.8 DriveTop Menu Structure

Files

Load File

You can choose from a list of available parameter files. The data within these parameter files can be loaded into the drive controller.

Note: In offline operation the content of the parameter files can be viewed and changed.

Save File

The actual parameters of a connected drive controller are stored in a parameter file on the PC.

Note: "DEFAULT.PAR". With the help of this parameter file, you can restore the state of the parameters of the drive controller at any time. For your own parameter data, you should use other file names.

Exit (Alt+F4)

Under the Menu item "End" you can leave the DriveTop program.

Parameter

Scan

As DriveTop is started, all the parameter information is read from the connected drive controller. Due to speed reasons, the specific parameter values are only read from the contents of the parameters.

Often one would like to move from one drive controller to another without restarting the DriveTop program. In order to refresh the parameter window, one must perform a new parameter scan after plugging in the interface cable into the another drive controller.

List of All Parameters

In this menu one can examine and change a list of all of the parameters of the drive controller. Therefore a “Low-Level" possibility is required for parameter examination that needs to be used in certain exceptional cases. Normally all the drive parameters regarding the start up procedure parameterization were implemented.

List of the Invalid Parameters

By switching from the parameter mode into the drive mode, the actual parameters will be checked for validity. All of the incorrect parameters and those that will lead to boundary value problems are placed in an invalid parameter list and can be corrected within the list.

Mode

The drive controller recognizes parameter mode and drive mode. Under this menu one can switch between the modes.

Motor Type

Under this menu, the connected motor data can be read and displayed. With offline operation, this activity must be performed manually.

Control Device Type

Under this menu, drive controller information can be read. From this information, the value of the overload factors and the PWM frequency, within which the drive should run, are read. With offline operation all of these activities must be done manually by the user.

Type of Operation

The installation of the desired type of operation.

Additional Parameter Displays

Additional parameter windows appear in the parameter menu. They are independent of the selected type of operation. The mentioned parameter windows are self-explanatory and will not be discussed further.

Startup Procedure

Hardware Connection

Under this menu one will find the help system where the connection to the drive controller is shown.

Parameter Settings

The parameters regarding the set up procedure leads the user through a series of dialogue procedures. At the end, all of the necessary installation requirements are set.

Drive

Scan

DriveTop can be physically connected to more that one drive controller at the same time with the use of an RS232/RS485 interface converter. Under the menu “Scanning", DriveTop looks for connected drives.

Select

If DriveTop is connected to more than one drive with the RS485 interface.Drive controller selection of which device is being communicated to is done from this menu.

Offline

DriveTop can be operated online as well as offline

Options

Language The language in which DriveTop functions and the language of the parameters and diagnostics of the drive controller can be selected or changed from this menu.

Help

Contents This menu accesses the online documentation. The online documentation contains a large scope of information regarding the functioning qualities of the drive system, parameter descriptions, and diagnostic descriptions.

Using Help There are on-screen general instructions to navigate through the help system.

Information over... Information regarding the software version of DriveTop.

3.9 Printing of the Parameter Data

DriveTop does not offer a direct possibility of printing the parameter files.

Parameter files are stored as ASCII files and can be viewed with almost any editor and printed. Should parameter files be printed, it is suggested that the Microsoft editor "Notepad" be used. Notepad is a part of Windows 3.1 and therefore available within Windows 3.1. To print a parameter file the following instructions are required:

An example of a parameter file "X_Axis.par":

- Under the Program Manager menu choose "Run - File..."
- At the command prompt type "Notepad X_Axis.par" and click the "OK icon."
- Click on menu item “File” then click on “Print”(The printing process will begin.)

4 Motor and Drive Controller Selection

4.1 General Information on Selecting a Motor and Drive Controller

An **ECODRIVE** system consists of a drive controller (DKC) and a servo motor (MKD). Selection documents (selection lists) can help in selecting the drive controller and motor for a specific application. These documents can be obtained from **INDRAMAT**.

Certain information about the motor and drive controller is used at start up to answer questions to install parameters. During online operation this information is read from the connected motor and drive controller and does not have to be entered by the user. During offline operation the drive controller and motor are not connected, necessitating the user to enter this information directly.

4.2 Motor Selection

Specific application information about the motor is needed for offline operation. DriveTop needs this motor-specific data to determine specific parameter settings. (Motor current, velocity, standard control parameters, feedback type, etc.)

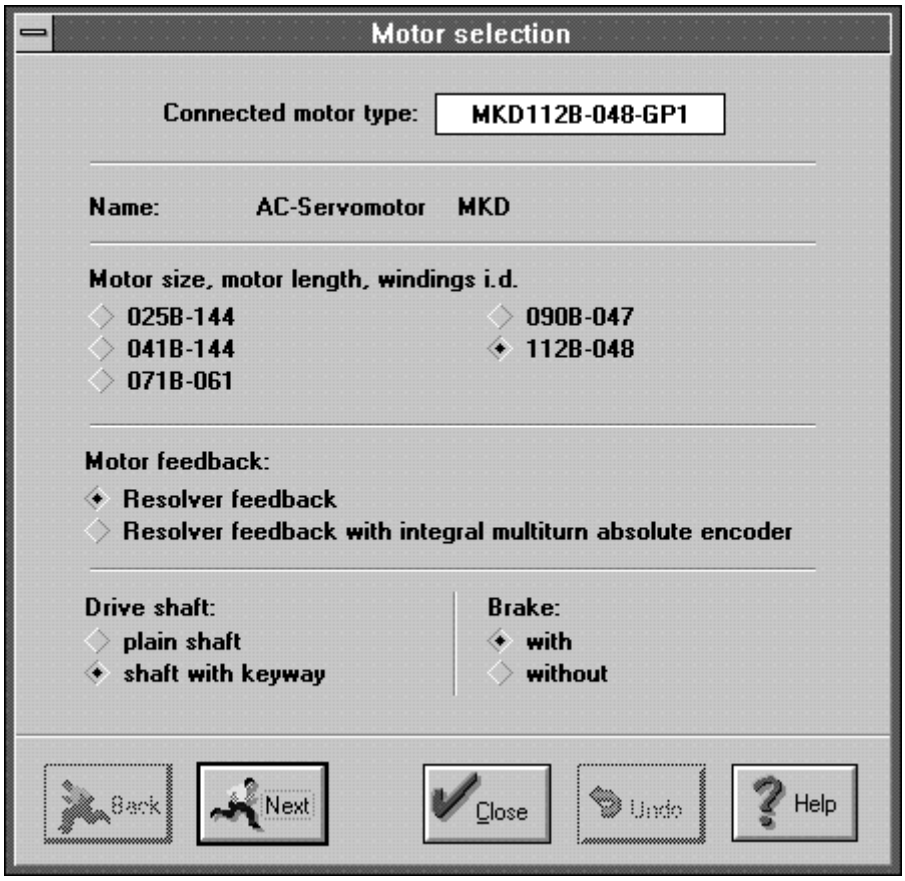


Figure 4-1: Motor selection

Note: If false motor data is entered here, the diagnostic "UL" appears on the drive controller display after the parameter settings have been loaded. This means that the type of motor in the parameters is not identical with the type of motor that is actually connected. If this happens, do the following:

- Acknowledge the error by pushing the S1-button on the drive controller. If the drive controller does not discover any additional errors, "bb" is displayed.
- Reset the installation parameters and recalculate the parameters of the drive controller limits.

4.3 Drive Controller Selection

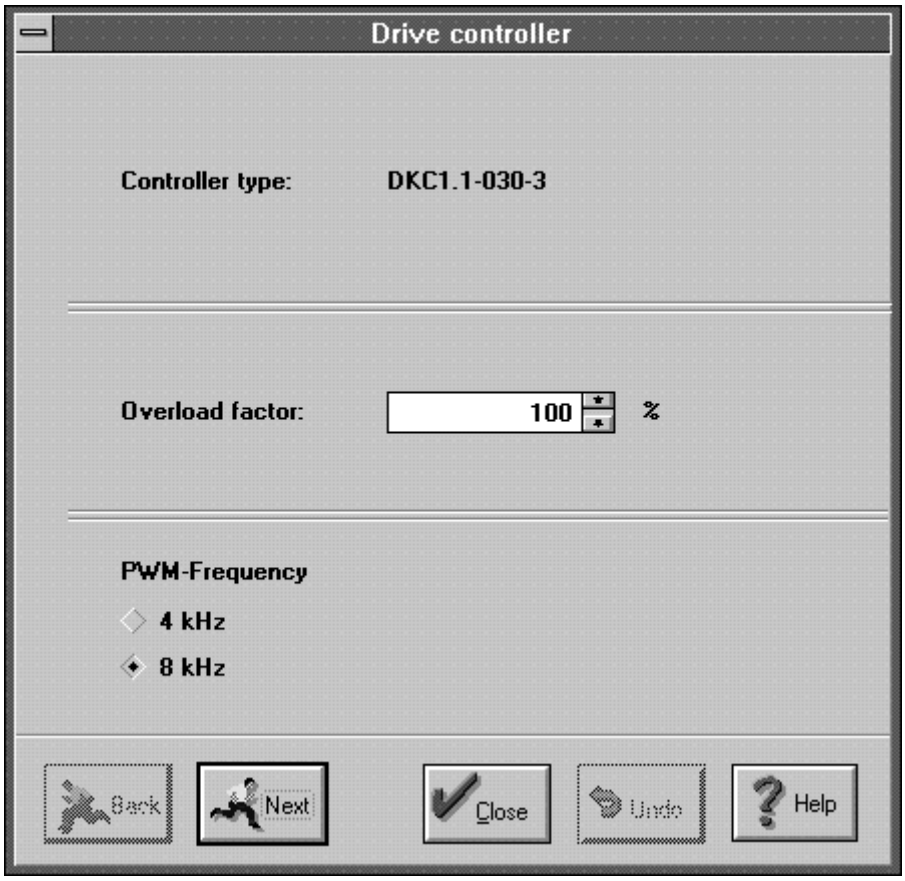


Figure 4-2:Drive Controller

Selecting the Drive Controller

For offline operation, select the type of drive controller. There are three which can be selected:

- DKC01.1-040-3-FW
- DKC01.1-040-7-FW
- DKC11.1-040-7-FW

The type of drive controller selected determines the availability of modes of operation and functions. This adjustment happens automatically during online operation by reading the "Controller Type" parameter of the connected drive controller.

Note: The DKC11.1 limits the available functions only during online operation.

Selecting the Overload Factor

The short term operating torque of the drive controller is defined via the overload factor. The velocities and torques available with the different combinations of drive controller, motors and power supply input voltages are provided in the DKC/MKD selection lists. The overload factor needed to obtain the drive controller data can be read off of the last column in each line of the selection list.

Note: The projected selection data is necessary for the correct adjust-ment.

Selecting the PWM-Frequency

The clock frequency of the power output (PWM-frequency) of the drive controller can be set to either 4kHz or 8kHz. The PWM-frequency determines the noise level of the motor, the permanent current carrying capacity of the drive controller, and also the available short term operating torque of the control drive. The following rules apply to the settings:

- The 4 kHz PWM-frequency should be used in standard applications to maintain the high short term operating torque of the drive controller.
- The 8kHz setting should be used in applications where the environment requires a low noise level. It is important to note that when using the 8kHz PWM-frequency, the drive controller has a lower permanent current carrying capacity as well as reduced short term torque. All permanent current and permanent torque data will be reduced by a factor of approximately 0.9.

5 DKC01.1 Drive Controller with Integrated Positioning Control

5.1 Fundemental Method of Operation for Position Control

The DKC01.1 can store up to 32 different position commands. Five selectable binary inputs (POS1...POS5) choose one of these position commands. A start signal initiates the position command. The following are allowable motion changes to the position commands:

- Desired Position
- Positioning velocity
- Positioning acceleration
- Positioning jerk
- Positioning mode

Note: The positioning speed can be changed by the Velocity Override Function (see 9.10).

5.2 Setting the Operation Mode: Position Control with Position Interface

The operational mode of "Position Control with Positioning Interface" is standardized through the operational mode window.

Operating mode selection
The following entry gives a name to the axis. Choose as you please, f. i. "x-axis".
The name appears in the headline of DriveTop and helps you to identify the actual online drive.
Name of axis :
x-axis
Operating mode:
Position regulation with positioning interface without lag
Close
Undo
Help

Figure 5-1: Position Control with Positioning Interface

Position Control with Following Error

When positioning in this mode, a speed dependent difference between the command position and the actual position is created (Following Error). The time relation between positioning depends on the fixed Kv factor and may cause a "creeping" into the desired position, especially with a small Kv factor.

Position Control without Following Error

An anticipitory speed control will position the drive controller without following error, thereby causing the command position and the actual position to be the same. Therefore, positioning is not dependent on a speed difference between the command and actual position.

Selecting the Appropriate Position Control Mode

In general, the position control without following error is advantageous because in this mode the drive reaches the desired position the quickest.(No Kv-factor-dependent creeping)

Through a less rigid mechanical system, undesireable acceleration knee points as well as the mechanical vibrations are loosened. If the application allows the disadvantages of the following error, then it is suggested that in this instance one uses the position control with following order.

Vibration will then be dampened through the reduction in the Kv factor. A compromise is thereby created between the positioning and the load rigidity.

5.3 Positioning Operation

Absolute Positioning

Absolute positioning commands store the desired position as a firm (absolute) position in the machine coordinate system.

Example: Absolute positioning with a desired position = 700

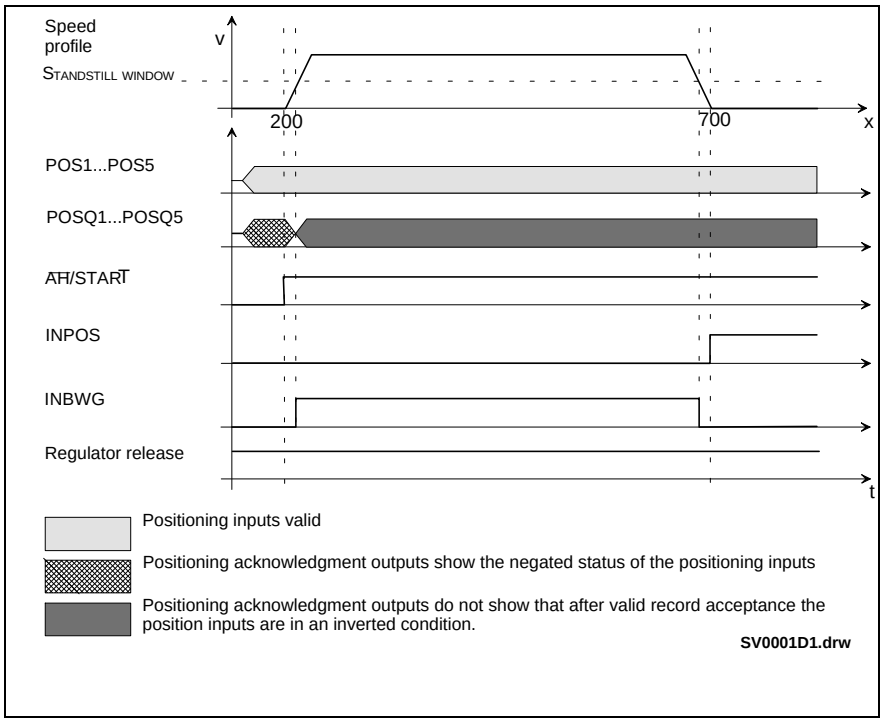


Figure 5-2: Absolute Positioning Command

Requirements for the Operation of an Absolute Positioning Command:

- The drive must be homed.
- The working area can be restricted to the position limit. Absolute positioning commands will only be completed when the desired position lies within the admissible working area.

Relative Positioning

In a relative positioning command, the desired position is referred to as a relative distance from the actual position.

Through a string of relative positioning commands, a string of distances can be positioned.

Note: If the relative positioning is used in order to start a string of position commands , it is important to consider that under the following requirements the string will be lost:

- Removing and reapplying of the drive controller enable signal
- Jogging between positioning commands
- Unending movement in the positive/negative direction between positioning commands
- Through the activation of a relative positioning command after an interrupted absolute positioning command
- Homing
- Setting an absolute distance

In this case, the relative positioning is set in respect to the actual position.
If the acceptance of a positioning command is rejected, the drive acts as if it had never been started.

If a string of relative positioning commands would be positioning continuously forwards or backwards (transport belt), then the scaling of the position data must be fixed in module format. (Module value = Transport belt length).

Example: Relative positioning with a desired position = 700 (actual position = 200)

Relative positioning commands will also be executed if the drive had not been homed.

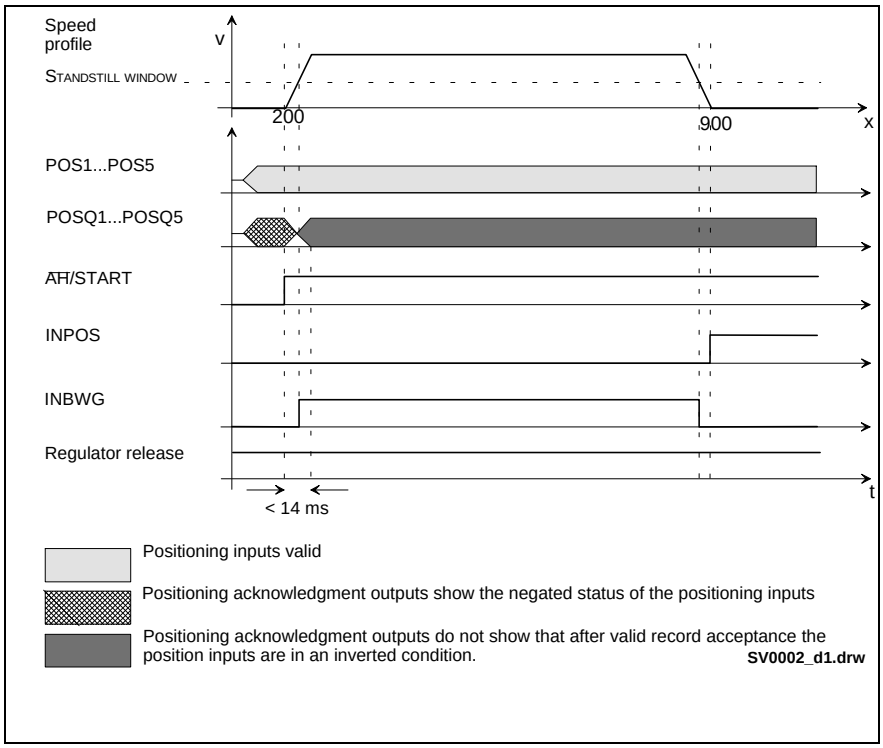


Figure 5-3: Relative Positioning Command

Interruption of Relative Positioning Commands

Example: Interruption of relative positioning command with a selected position = 600

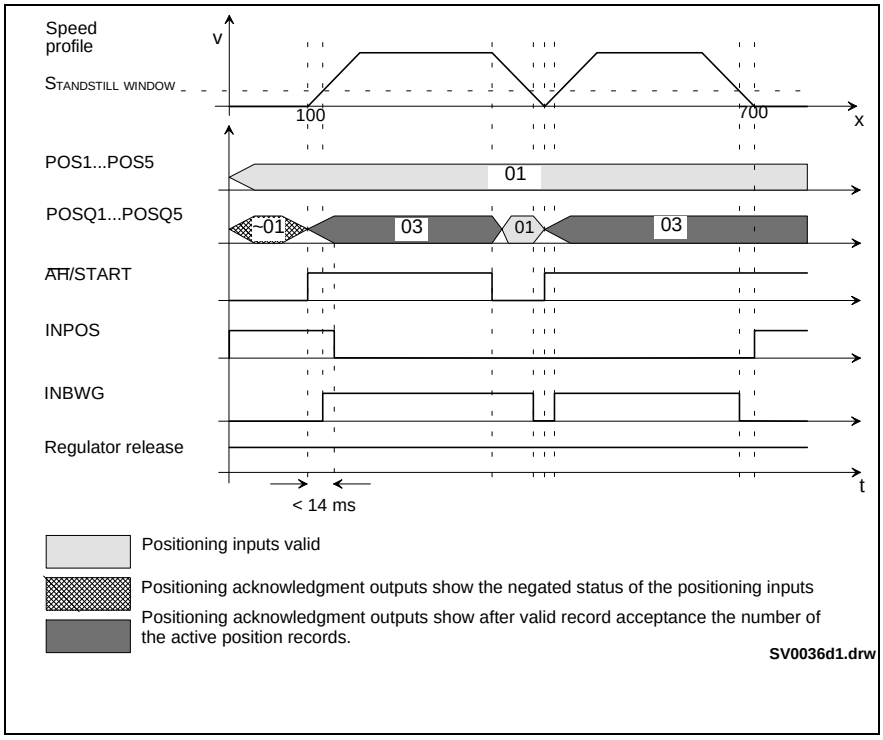


Figure 5-4: Interruption of Relative Positioning Commands

Note: After the interruption of a relative positioning command, another relative positioning command will be started with its relative position taken from the actual position. The relation of the string of distances is lost.

Relative Positioning Command after the Jogging Operation.

Example: Interruption of the relative positioning command after the jogging operation with selected position = 600

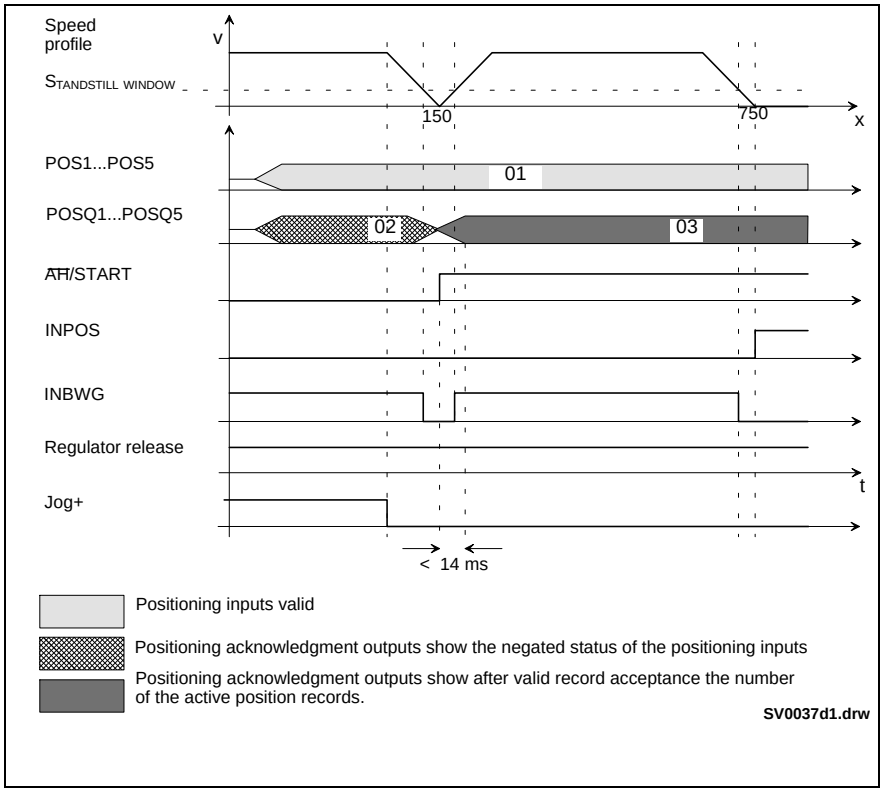


Figure 5-5: Relative Positioning Command after the Jogging Operation

Relative Positioning Command after Activation of the Drive Controller Enable

Example: Interruption of relative method command after activation of the RF with desired position = 600

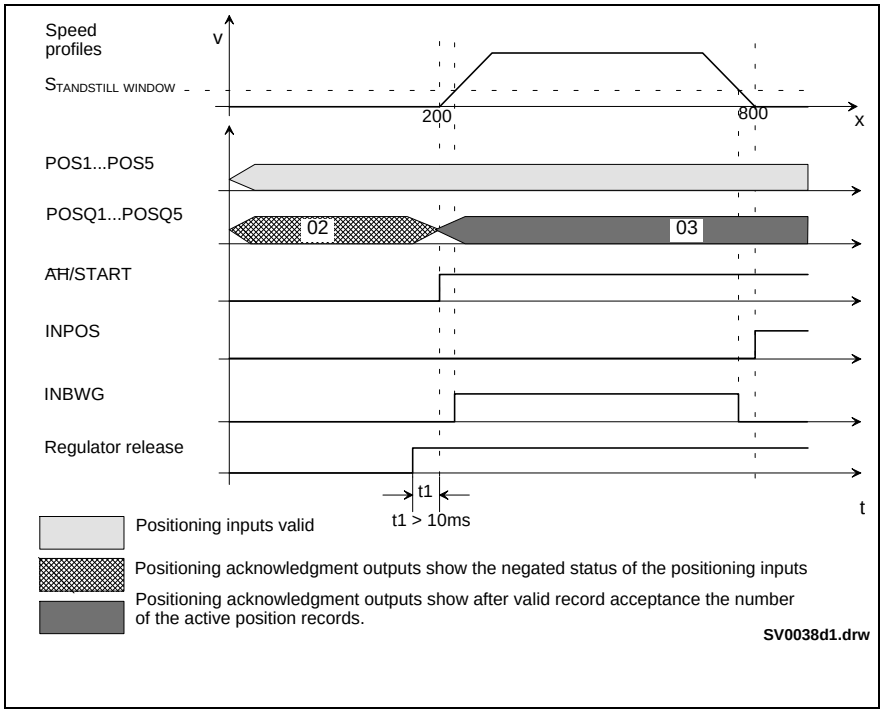


Figure 5-6: Relative Positioning Command after Activation of Drive Controller Enable

Continuas Movement in Positive/Negative Direction

Should a motor with a defined speed, acceleration and jerk move without a specific desired position, then the method command mode must be specified as: "Movement in the positive direction" or "Movement in the negative direction". The drive controller moves continuously in the given direction until the start signal is removed(i.e. one of the position limits or limit switchs is reached).

The desired position is meaningless in this positioning mode.

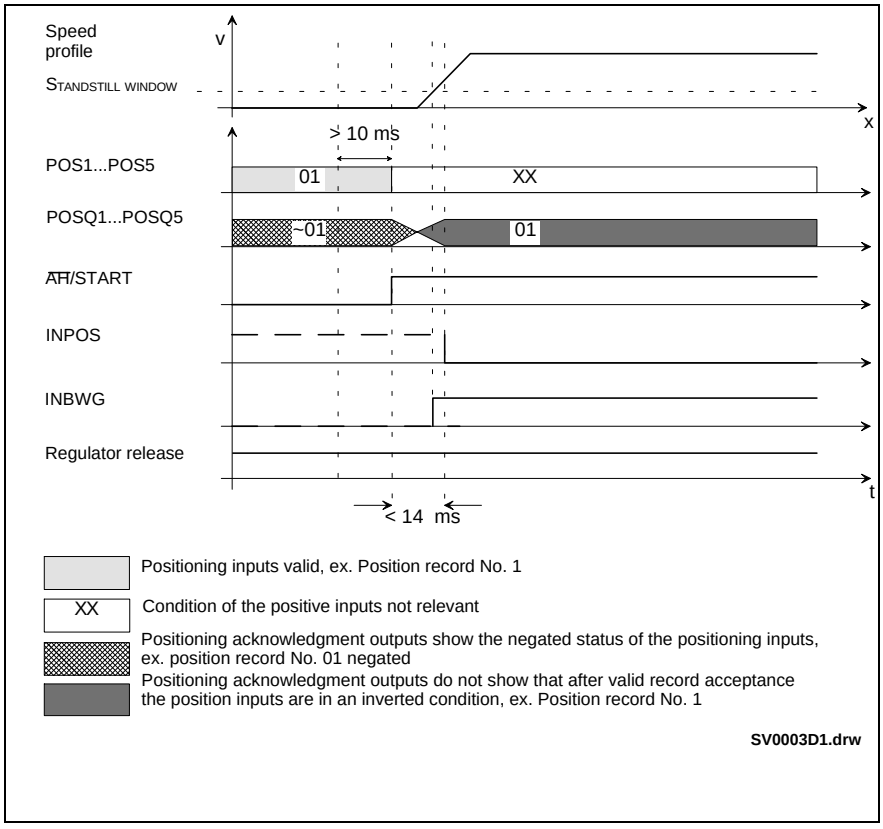


Figure 5-7: Unending Movement in Positive/Negative Direction

5.4 Positioning Command Input

Positioning command data will be established over the positioning command input window.

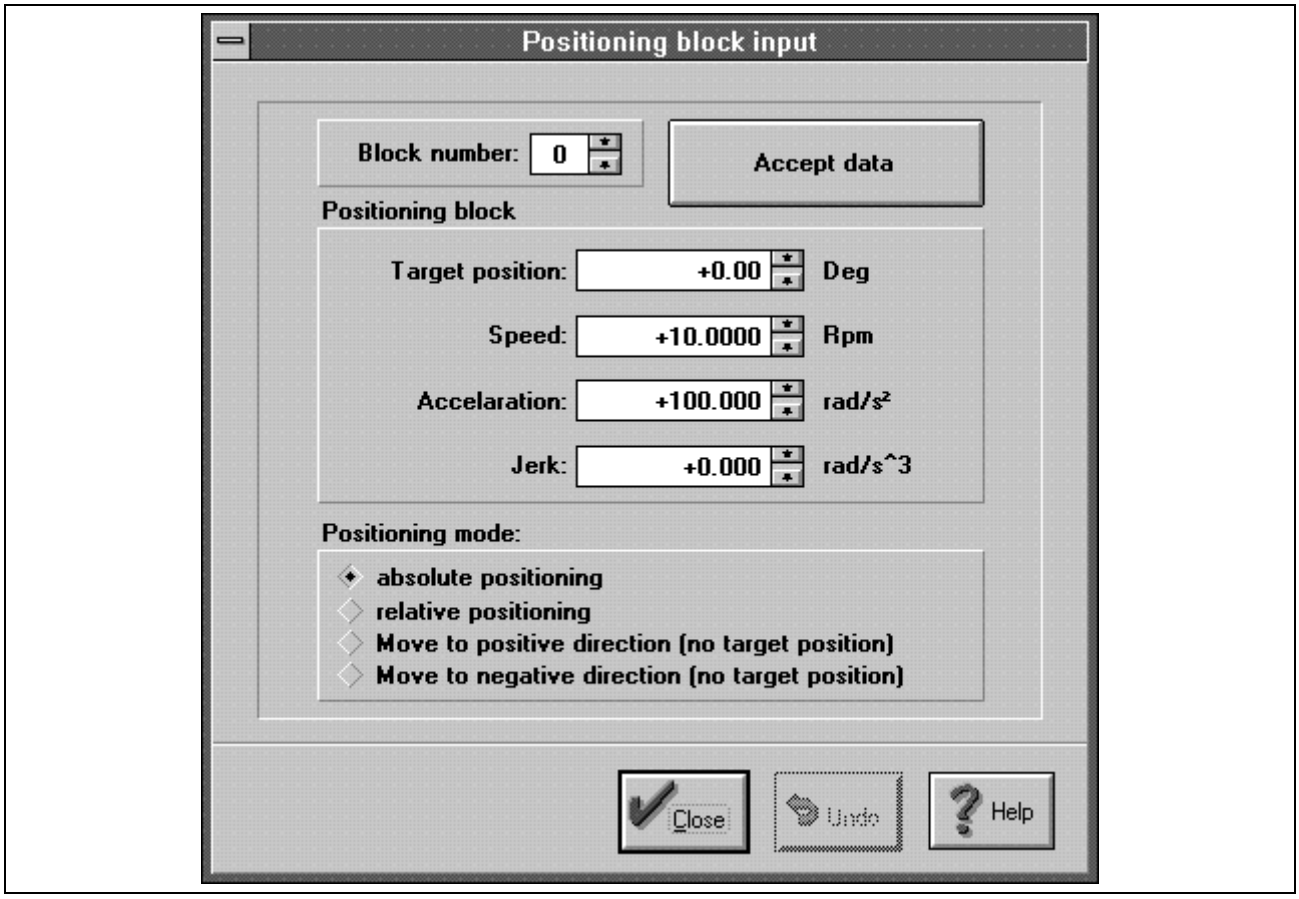


Figure 5-8: Positioning Command Input

Command Number

The command number indicates the address of the positioning commands where these commands can be pulled up under the command choice directory.

Positioning Command Data

Desired Position

The position where the drive controller should be positioned is supplied from the input array of desired positions. The desired position, independent of the positioning mode, can be relative or absolute.

Positioning Velocity

The positioning velocity, with which the desired position will be reached, can be established here. With the Feedrate override function, the speed during the positioning can be dynamically changed.

Positioning Acceleration

The positioning acceleration, with which the drive accelerates and decelerates, can be defined for every positioning command. The jerk of the acceleration happens under allowance of the following points of consideration:

- Maximum torque of the motor in response of the motor and drive controller combination
- Inertial torque and frictional torque of the connected mechanical system

Positioning Jerk

A "jerk" will represent the acceleration change of a movement. ECODRIVE presents the opportunity to limit the jerk of a movement. The jerk limit will advantageously be set in order to avoid vibration through which the acceleration or deceleration will generate. This specific effect can be caused especially with a moveable stiff mechanical system.

Instruction for Installation of the Positioning Jerk

In most cases the jerk limit is not required and should be turned of during the startup procedure. The jerk limit will be deactivated if set to a value of zero.

If there appears to be an unacceptable vibration in the acceleration and deceleration phase of the positioning procedure, one can minimize the vibrational inducement of the mechanical system through the gradual change of the positioning jerk.

Thereby the maximum value of the jerk should begin and be reduced until an acceptable positioning movement arises.

A rough approximation validating the jerk limit:

$$\text{Jerk } [\frac{mm}{s^3}] \; > \; 2 \cdot \frac{\text{Acceleration } [\frac{mm}{s^2}] \cdot 60 \; [\frac{s}{min}]}{\text{Speed } [\frac{mm}{min}]}$$

Formula 5-1: Jerk Limit through Linear Scaling

$$\text{Jerk } \; [\frac{rad}{s^3}] \; > \; 2 \cdot \frac{(\text{Acceleration } [\frac{rad}{s^2}])^2 \cdot 60 \; [\frac{s}{min}]}{\text{Speed } \; [\frac{Umdr}{min}] \cdot 2 \cdot \pi \; [\frac{rad}{Umdr}]}$$

Formula 5-2: Jerk Limit through Rotary Scaling

Positioning Mode

The positioning mode establishes if the drive controller acts in a relative, absolute or positioning command with a desired position.

Data Receiving

The given positioning command data is not intially active. Upon sending of the positioning command, the data is first written into the drive controller. During the setup it is helpful if the data can be directly tested. For this case all the given positioning commands can be loaded into the drive controller through the "Data Transmission" key without the window having to leave the screen.

5.5 Choosing, Starting and Selection of a Positioning Command

Choosing a Positioning Command

There are five binary position command selection inputs in the DKC1, POS1...POS5. The command number of the desired positioning command is selected as binary signal types in the command.

Starting of Positioning Commands

Positioning commands will be activated fundementally by a low to high signal transition at the AH/Start input.

Use of the Command Selection Inputs

The correct transfer and operation of positioning commands can be monitored through the command selection acknowledgements, POSQ1...POSQ5, of the connected drive controller.

There are five corresponding command selection acknowledgements for the five command selection inputs.

The command acknowledgements serve the following purposes:

- Cable Failure Monitoring
- Acknowledgement of assumption of active commands

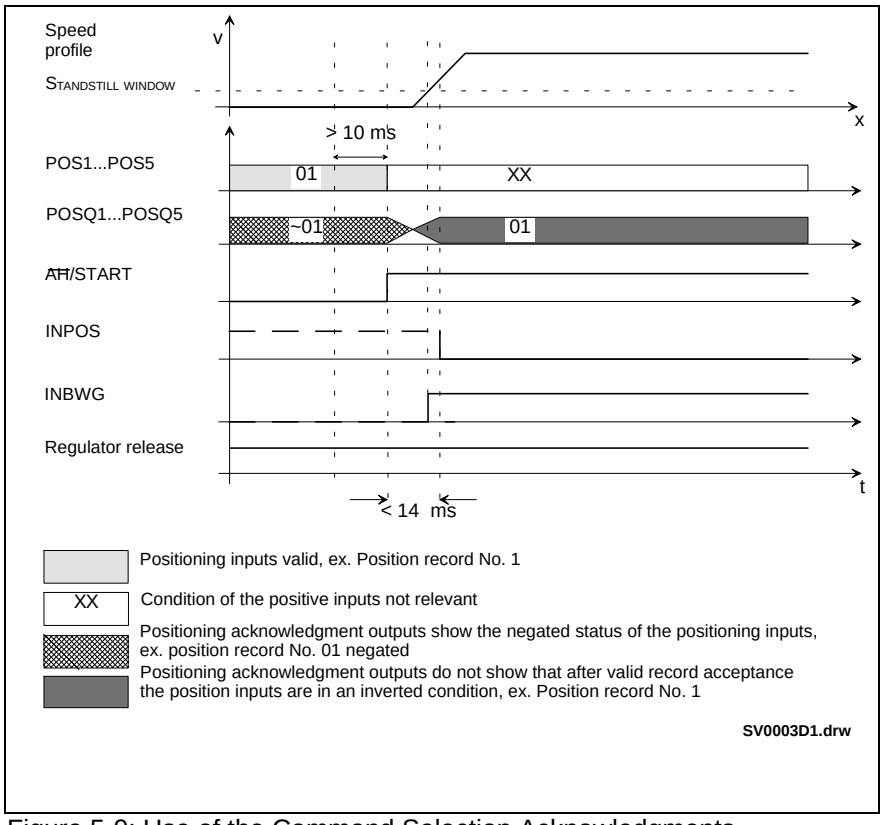


Figure 5-9: Use of the Command Selection Acknowledgments

Note: After activation of the AH/Start-Signals, the transfer of the new positioning commands will be acknowledged after about 14 ms by means of the command selection acknowledgement outputs.

At the same time the drive controller will set the "In Position Output" = logic 0 if the new desired position is not reached.

See also Status Messages.

Interruption of Positioning Commands

Positioning commands can be interrupted during the command operation through removal of the start-signal (AH/START = logic 0).

5.6 Desired Positioning Manipulation through Modulus Scaling

Because the scaling of the position data is in modulus format, the desired position can only be in the range of zero to the given modulus value.

The operation distance of a positioning command can also have the maximum amount of the modulus value.

Example 1:

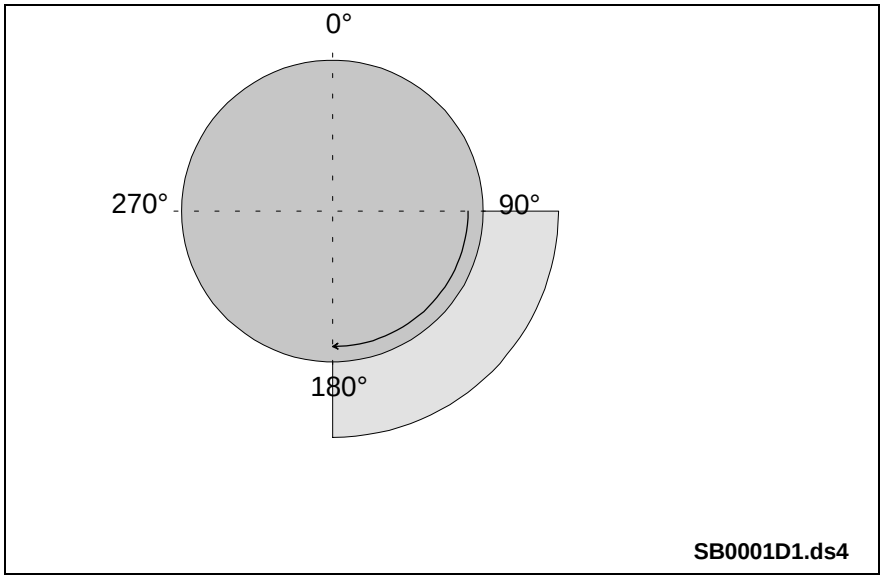


Figure 5-10: Positioning through Modulus-Scaling(positive direction)

The modulus value in this example is set at 360°. The drive controller is positioned at 90°. Through activation of an absolute positioning command of desired position = 180° or through activation of a relative positioning command 90°, the drive moves from 90° to 180°.

Example 2:

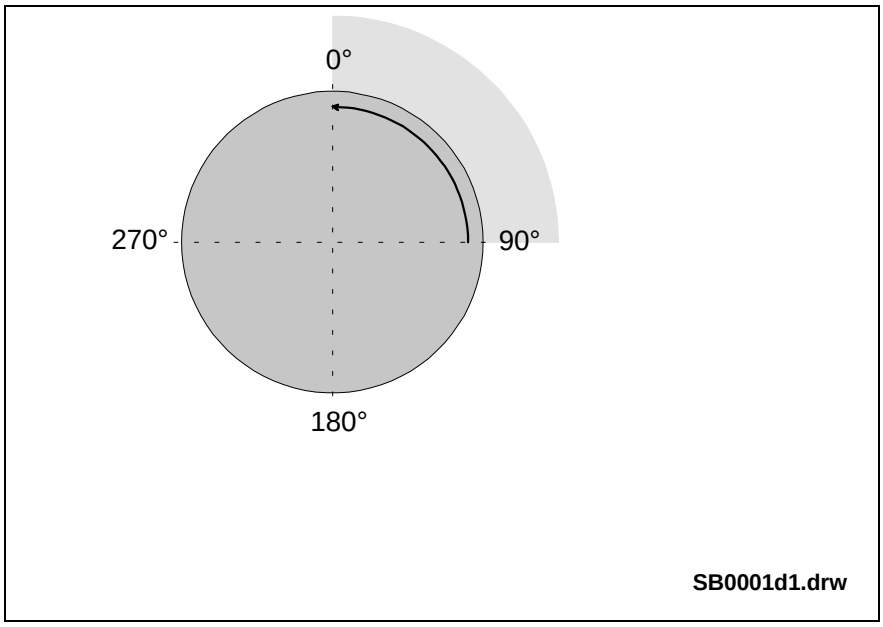


Figure 5-11: Positioning through Modulus-Scaling(negative direction)

Through activation of a absolute positioning command with desired position of 0° or through activation of a relative positioning command with desired position of 270°, the drive moves **90° backwards.**

Note: A specific rotation can be selected if the "Command Value Mode for Modulo Format" is installed (only negative or always positive. See parameter description).

With modulo format, there are no installable negative desired positions. In spite of the actual backward desired position, one must follow the given instructions in order for the desired position to move.

$$\text{Target Position to be entered} = \text{Modulo value} - \text{path which should be followed}$$

Formula 5-3: Calculation of a relative desired position through movement in the negative direction

5.7 Connection Illustration of the Positioning Interface

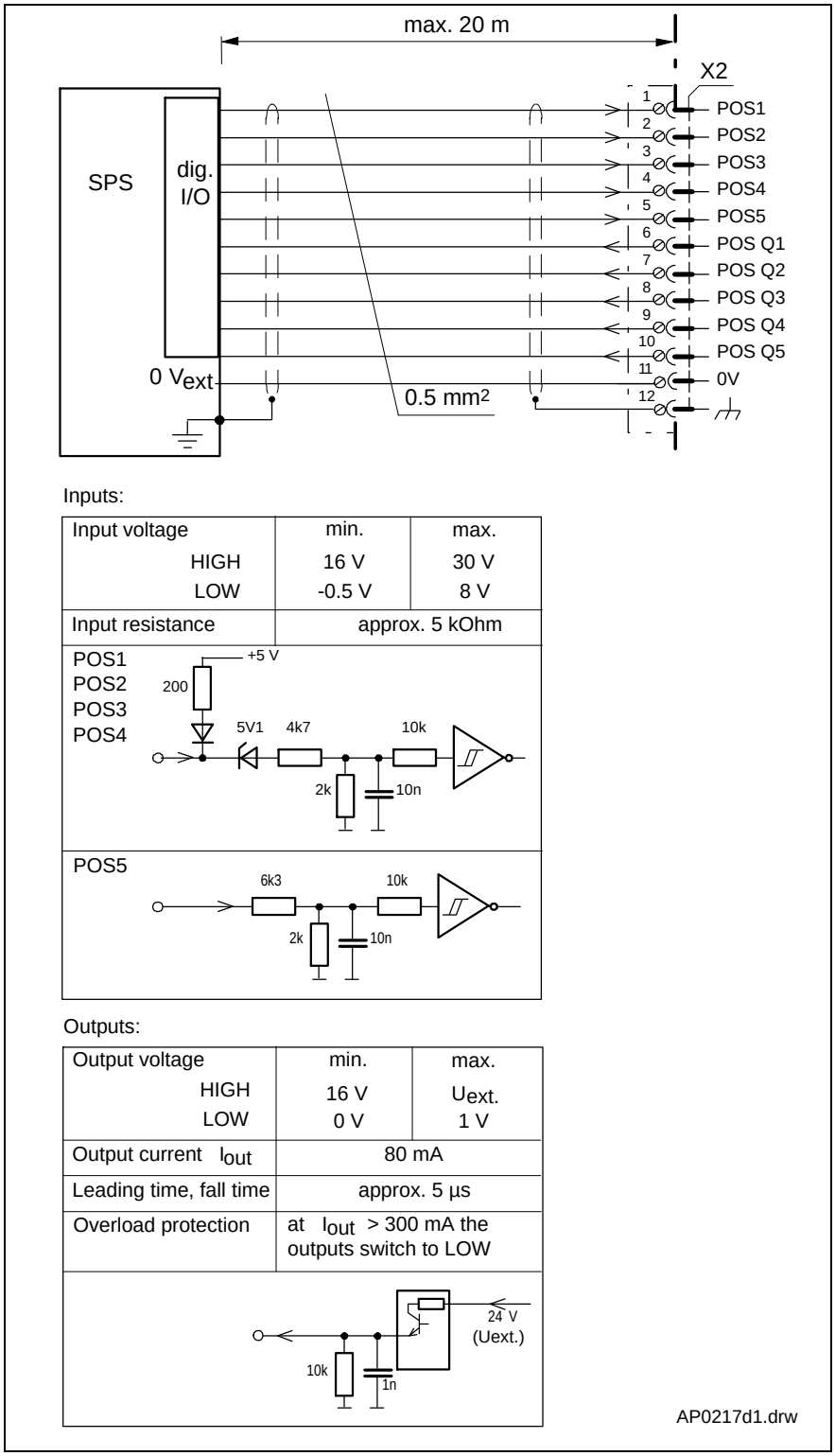


Figure 5-12: Positioning interface

POS1.....POS5: Positioning command - selection inputs (binary coded)

POSQ1.....POSQ5: Positioning command - selection acknowledgements (binary coded)

Notes

6 DKC01.1 Drive Controller with Stepping Motor Interface

6.1 General Information for Operation with Stepping Motor Interface

The **ECODRIVE** acts as a conventional stepping motor drive controller in the stepping motor interface operating mode. This enables conventional stepping motor controls to be attached to the **ECODRIVE**.

Note: Because the ECODRIVE digitally replicates a stepping motor drive, its use is not recommended for applications where precision is required. INDRAMAT has a line of excellent drive systems with SERCOS interfaces for applications such as this.

6.2 Setting the Operation Mode: Position Control with Stepping Motor Interface

The operating mode with stepping motor interface is set via the operating mode dialog.

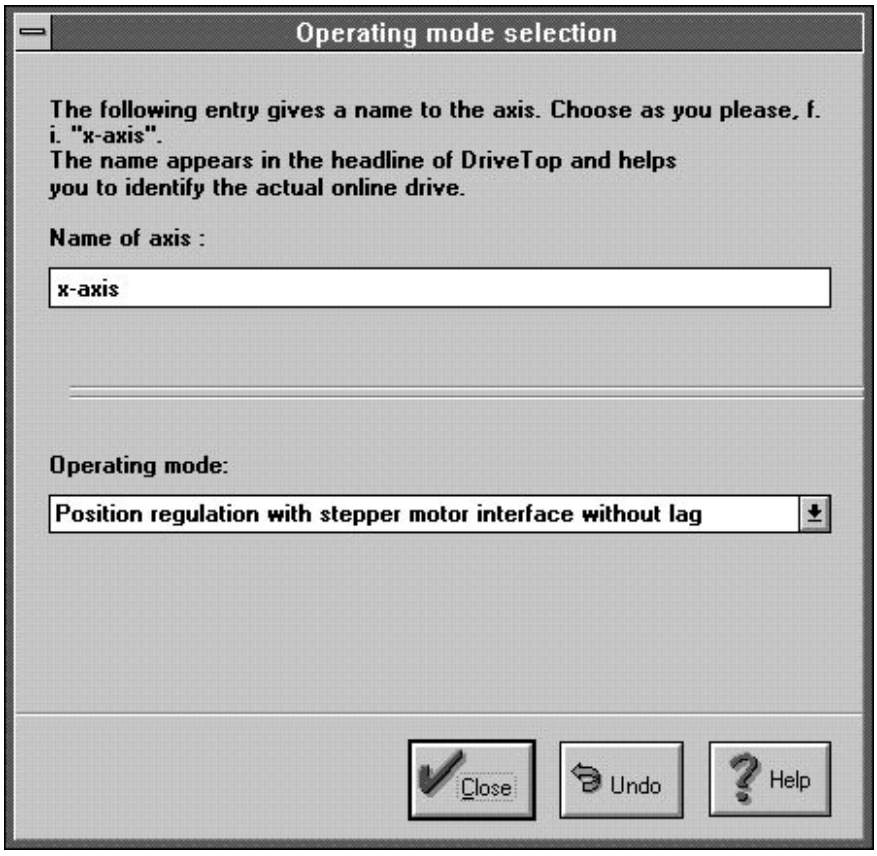

Operating mode selection
The following entry gives a name to the axis. Choose as you please, f. i. "x-axis".
The name appears in the headline of DriveTop and helps you to identify the actual online drive.
Name of axis :
x-axis
Operating mode:
Position regulation with stepper motor interface without lag
Close
Undo
Help

Figure 6-1: Position Control with Stepping Motor Interface

Position Control with Following Error

When positioning in this mode, a speed dependent difference between the command position and the actual position will be created (Following Error). This synchronized action when positioning is dependent on the Kv-factor setting and causes a "crawling" towards the desired position, especially with small Kv-factors.

Position Control Without Following Error

In the position control with following error mode, a speed control ensures that the command position and actual position are always the same. There is no speed dependent difference between command position and actual position.

Selecting the Appropriate Position Control Mode

Because the drive controller simulates the behavior of an actual stepping motor in the position control without following error mode, this mode should be given preference.

In less rigid mechanical systems, the acceleration knee points created by this mode cause undesireable mechanical vibrations. The position control with following error mode should nevertheless be used if the application allows this disadvantage.

Vibration will then be dampened by reducing the Kv factor. Doing this creates a compromise between the positioning action and the load rigidity.

6.3 Stepping Motor Signal Processing

In the operating mode "Position Control with Stepping Motor Interface", the DKC converts impulses from external inputs into defined position changes. The following modes can be selected:

- Quadrature signals
- Forward/backward signals
- Step and direction signals

The steps per revolution executed by the drive controller can be adjusted.

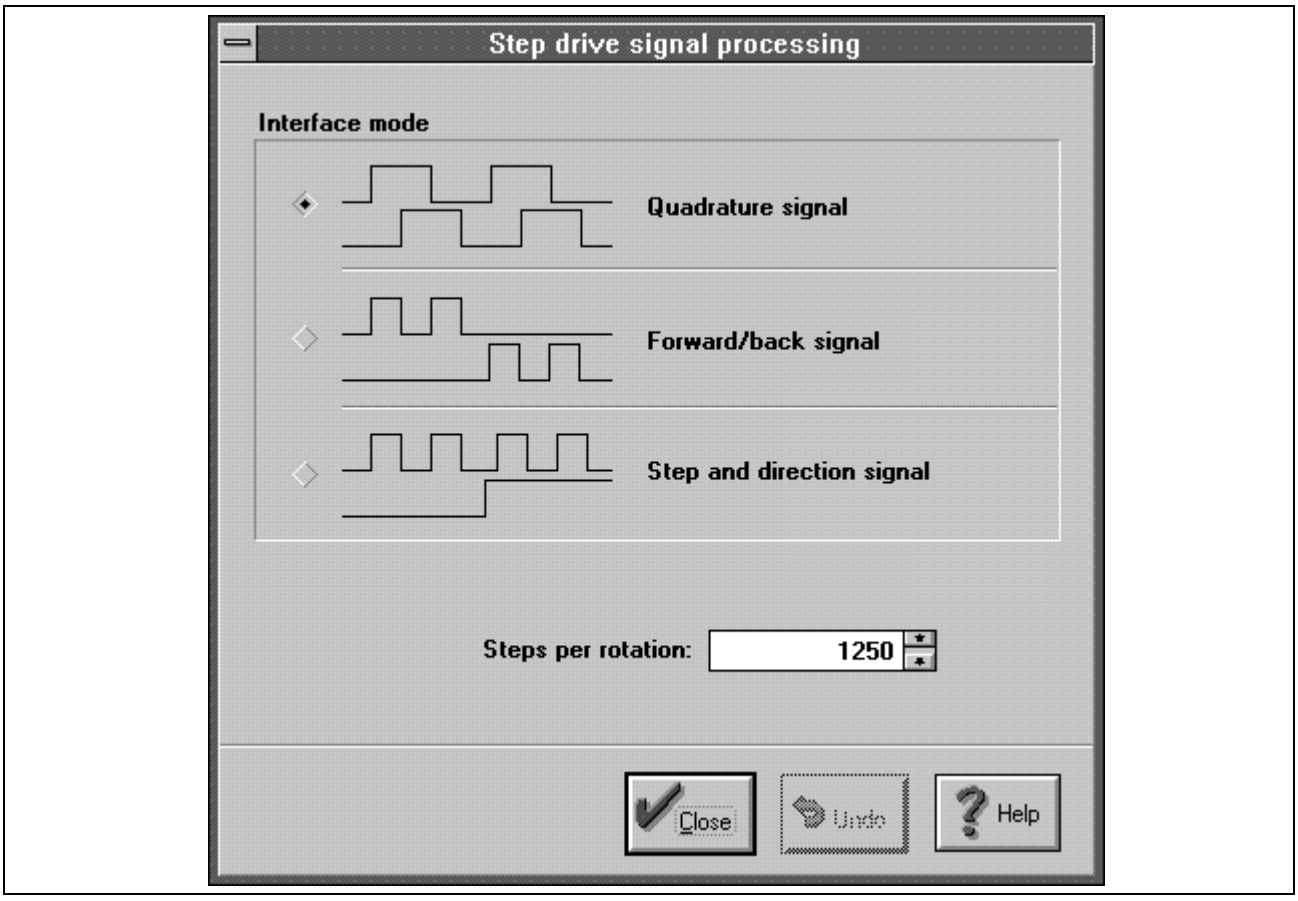


Figure 6-2: Stepping Motor Signal Processing

6.4 Stepping Motor Interface

Interface Mode

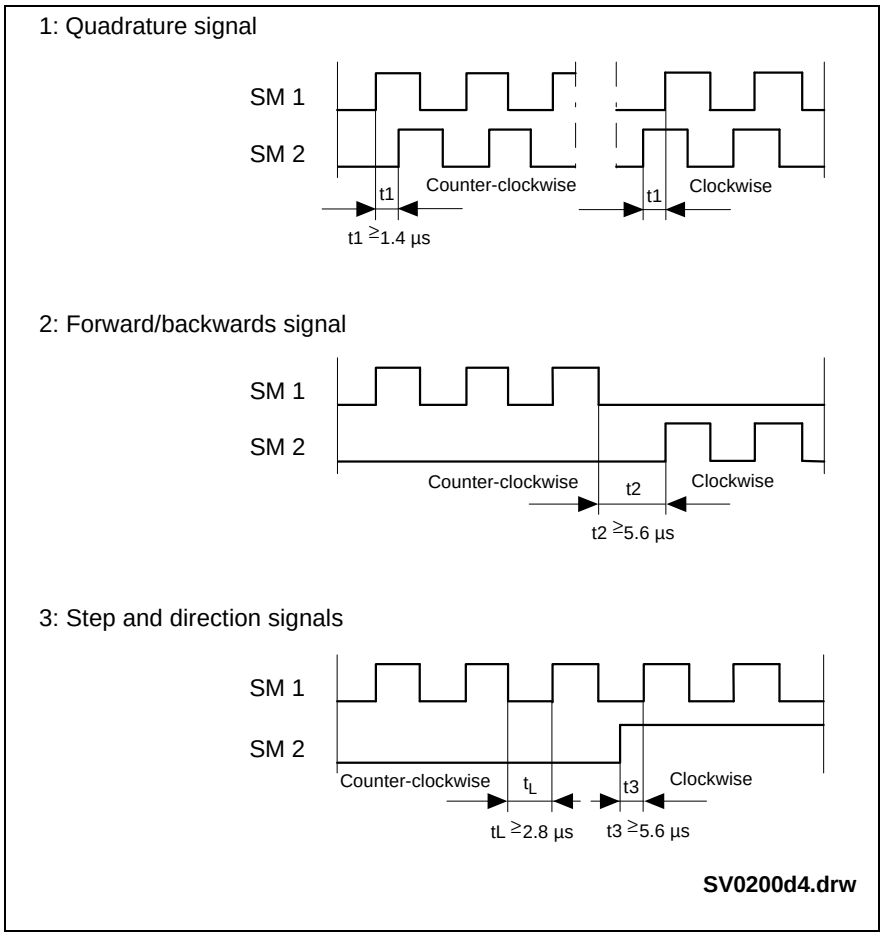


Figure 6-3: Stepping Motor Interface Mode

Stepping Motor Interface

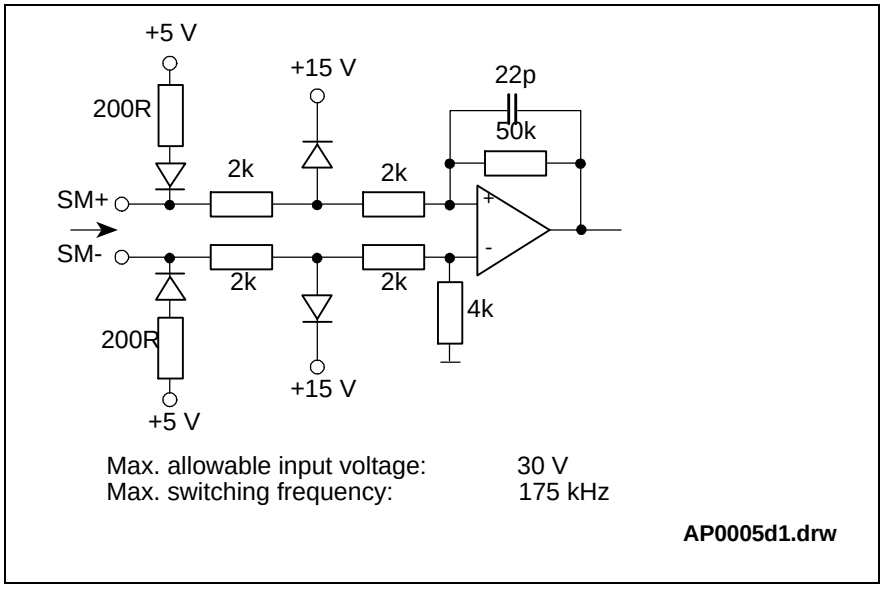


Figure 6-4: Stepping Motor Interface

6.5 Types of Stepping Motor Signal Connections

Signals can be exchanged with the stepping motor control in two ways:

- Differential signals
- Open-collector signals

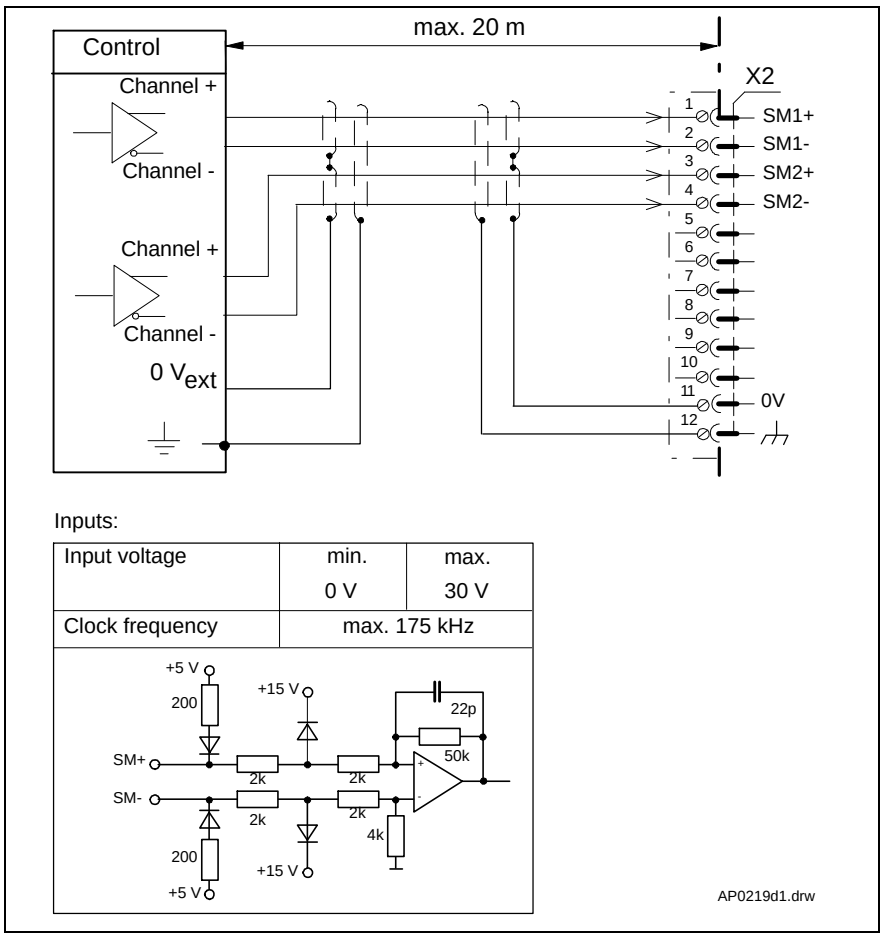


Figure 6-5: Stepping Motor Transmission with Differential Signals

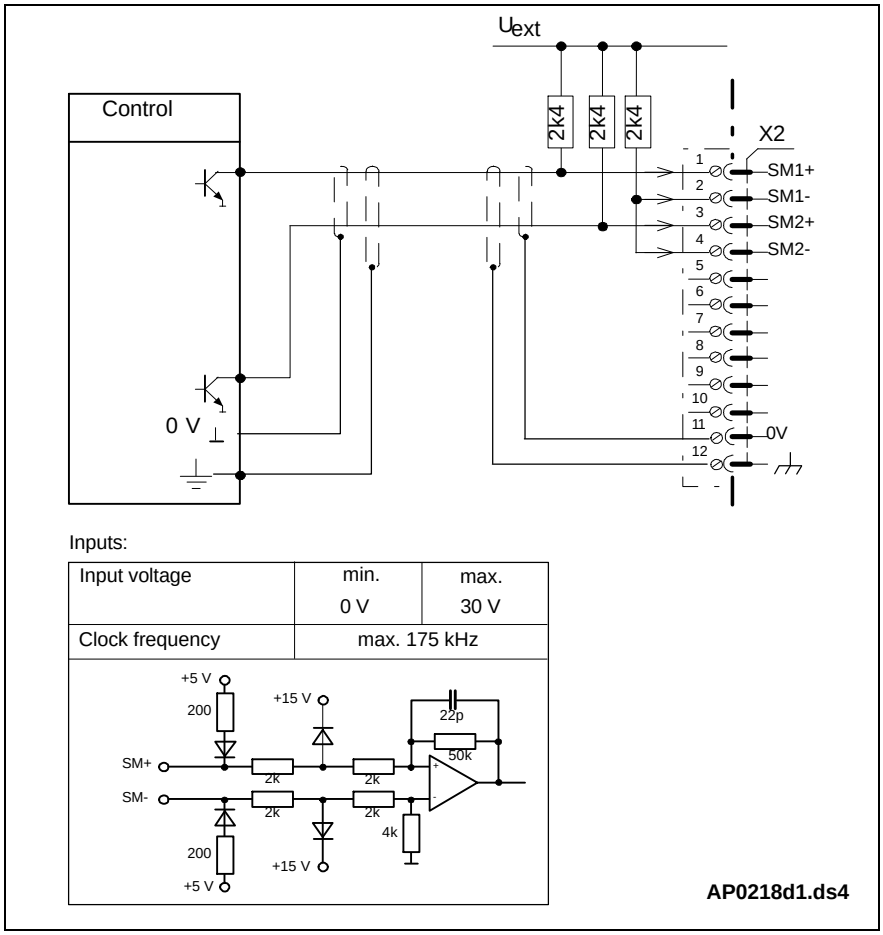


Figure 6-6: Stepping Motor Signal Transmission with Open-Collector Signals

Note: Transmitting the stepping motor signals as differential signals is recommended because the differential signals have a higher interference resistance.

7 DKC01.1 / DKC11.1 Drive Controller with Analog Speed Interface

7.1 General Notes for Operating with an Analog Speed Interface

In the "Speed Regulation with Analog Interface" operating mode, the **ECODRIVE** acts like a conventional analog servo drive. This makes it very easy to operate with normal NC control systems.

Note: The digital signal processing in **ECODRIVE** might lead to interferences. It is therefore not recommended that **ECODRIVE** be used in precision applications. **INDRAMAT** has a line of excellent drive systems with **SERCOS** interfaces for applications of that type.

7.2 Setting the Operating Mode: Speed Regulation with Analog Interface

The "Speed Regulation with Analog Command Value" operating mode can be set through the Operating mode selection dialog box.

Operating mode selection
The following entry gives a name to the axis. Choose as you please, f. i. "x-axis".
The name appears in the headline of DriveTop and helps you to identify the actual online drive.
Name of axis :
x-axis
Operating mode:
Speed regulation with analog interface
Close
Undo
Help

Figure 7-1: Speed Regulation with Analog Command Value

7.3 Analog Speed Command Value Processing

The analog interface must be adapted to the connected NC control system. The command value scaling, the input offset, and the command value smoothing must be set to do this.

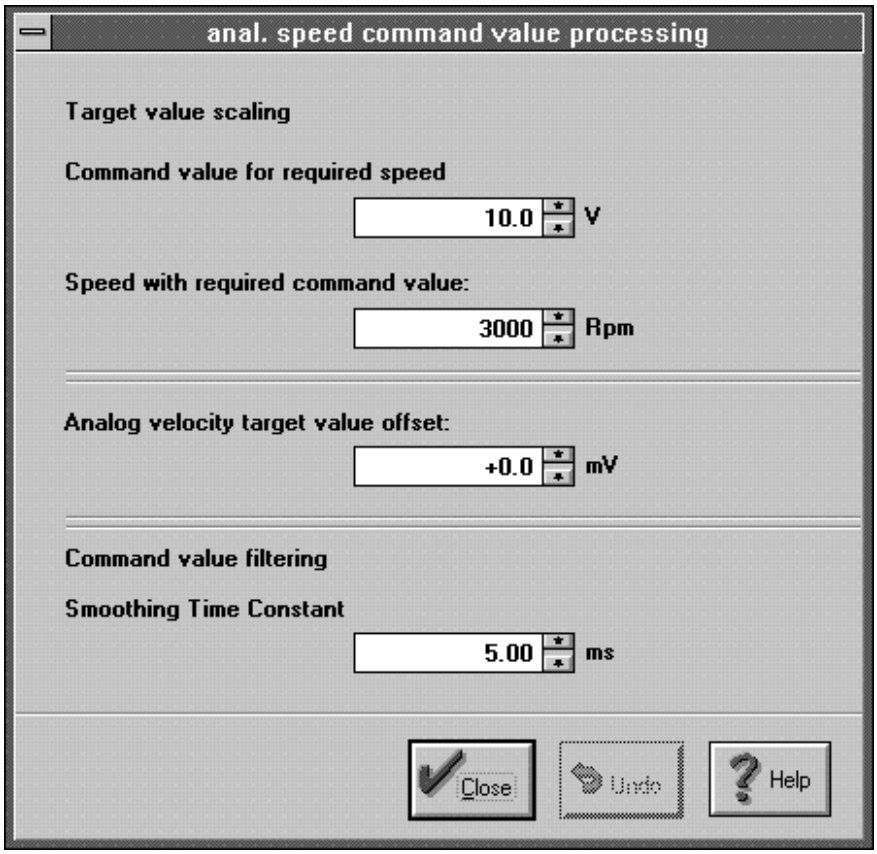


Figure 7-2: Analog Speed Command Value Processing

Command Value Scaling

In order to scale the analog velocity command value, the maximum command voltage value must be entered in the parameter "Command Value for Required Speed" at which a specific speed is to be achieved. The maximum speed is entered in the parameter "Speed with Required Command Value".

The command and speed parameter values always refer to the motor shaft independent of the attached gears and the scaling setting.

Offset Setting of the Analog Velocity Command Value

When the speed command value voltage is at 0V, the drive should be at a standstill. The "Analog Velocity Target Value Offset" parameter can be used to compensate for offsets in the analog signal processing.

If the DKC together with the NC control system are being operated in the position control, the offset setting can be used to adjust the static position deviation to zero. The axis in position monitoring should be used to do this. The offset parameter should be adjusted while the axis is at a standstill until the following error display for the NC control system displays the value zero.

Command Value Smoothing

Position loop in NC control systems work with a specific cycle time. Very often this cycle time is in the range from 5ms to 20ms. The velocity command values produced by the NC affect the drive controller like springs and cause vibrations and noises in the machine mechanics.

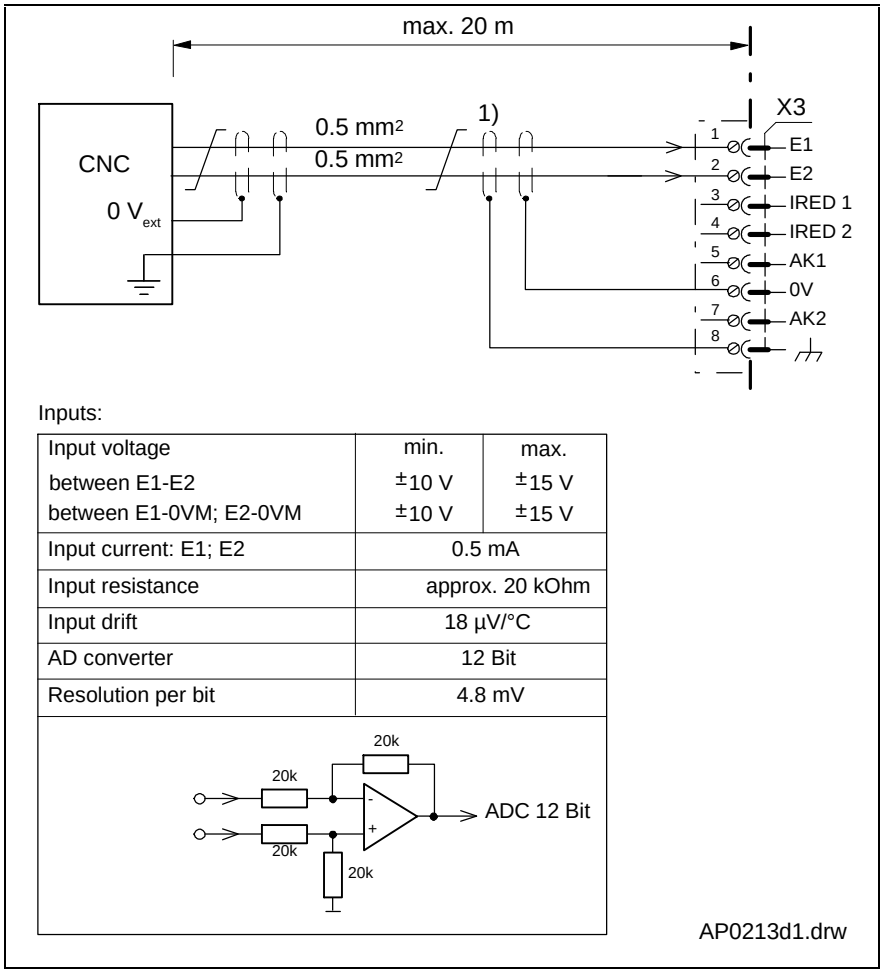
In order to reduce the vibrations, the command values can be filtered through the command value smoothing.

The rule of thumb is:

filter time constant = 0.3 ... 0,5 · command value smoothing

Formula 7-1: Specification of the Filter Time Constant for the Command Value Smoothing

Analog Interface



Inputs:

Input voltage	min.	max.
between E1-E2	±10 V	±15 V
between E1-0VM; E2-0VM	±10 V	±15 V
Input current: E1; E2	0.5 mA	
Input resistance	approx. 20 kOhm	
Input drift	18 µV/°C	
AD converter	12 Bit	
Resolution per bit	4.8 mV	

Figure 7-3: Connection Diagram of the Analog Speed Interface

Notes

8 DKC01.1/DKC11.1 Drive Controller with Analog Torque Interface

8.1 General Instructions for Operation with Torque Interface

ECODRIVE can also be operated in the Torque regulation operating mode. The drive may have to generate a defined torque in special applications. Examples of this type of applications are:

- Clamping of work pieces
- Master-slave operation for multiple axes

Note: **INDRAMAT** must be notified before **ECODRIVE** is used in this operating mode.

WARNING

Danger of accidents caused by uncontrolled axis movements

If **ECODRIVE** is to be used as a torque regulated control drive, the protection mechanisms must be used to prevent people or machines from being damaged!

⇒ Be aware: without external supervision the motor velocity during torque regulation can clime up to the maximum velocity as a result of very small command value settings, if there is no opposing torque in effect.

8.2 Setting the Operating Mode: Torque Regulation with an Analog Command Value

The "Torque Regulation with an Analog Command Value" operating mode can be set through the Operating Mode Selection dialog box.

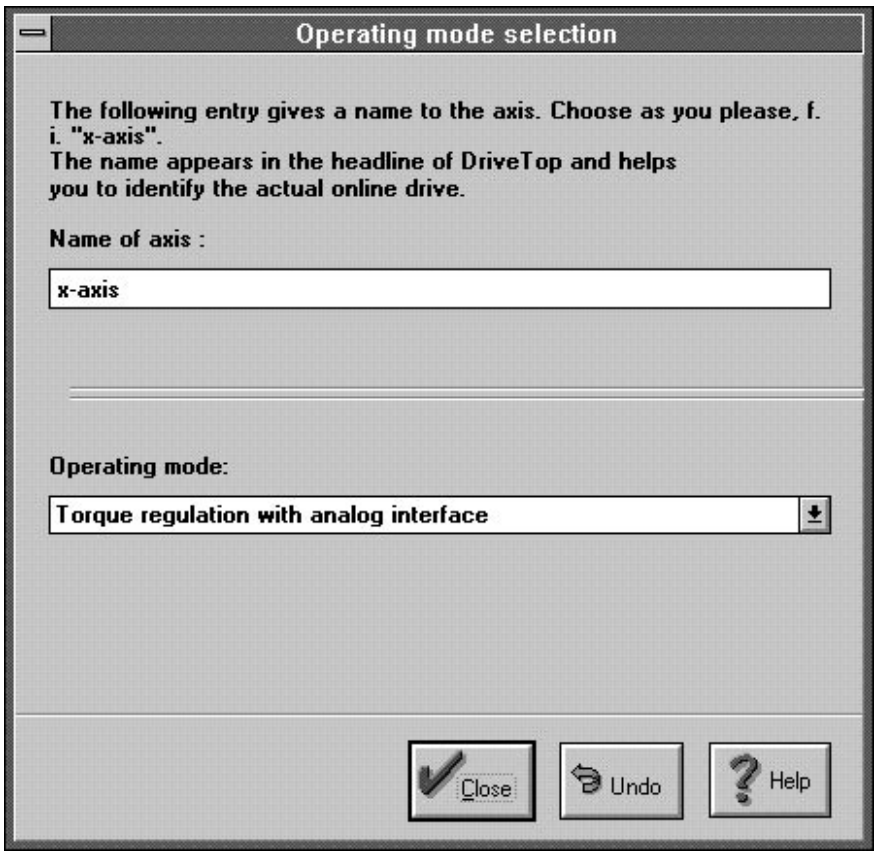

Operating mode selection
The following entry gives a name to the axis. Choose as you please, f. i. "x-axis".
The name appears in the headline of DriveTop and helps you to identify the actual online drive.
Name of axis :
x-axis
Operating mode:
Torque regulation with analog interface
Close
Undo
Help

Figure 8-1: Torque Regulation with an Analog Command Value

8.3 Analog Torque Command Value Processing

Scaling the Analog Torque Command Value

The following stipulation is always in force for analog voltage at the command value input in Torque regulation:

The maximum effective peak torque is emitted when the input voltage is at 10V.

The maximum effective peak torque is dependent upon the motor-drive controller combination and the current torque limit value.

Adjusting the Offset of the Analog Torque Input

In order to adapt the offset voltages to the analog command value transmission, an offset can be set in the drive controller.

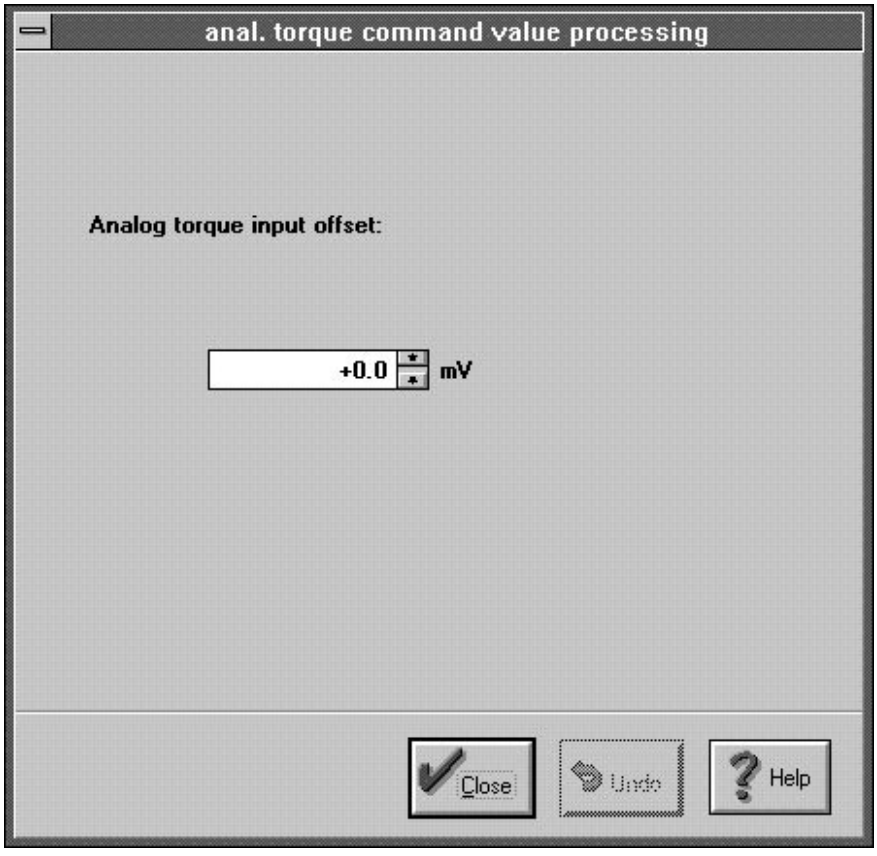


Figure 8-2: Input Offset Adjustment in Torque Regulation

Analog Interface

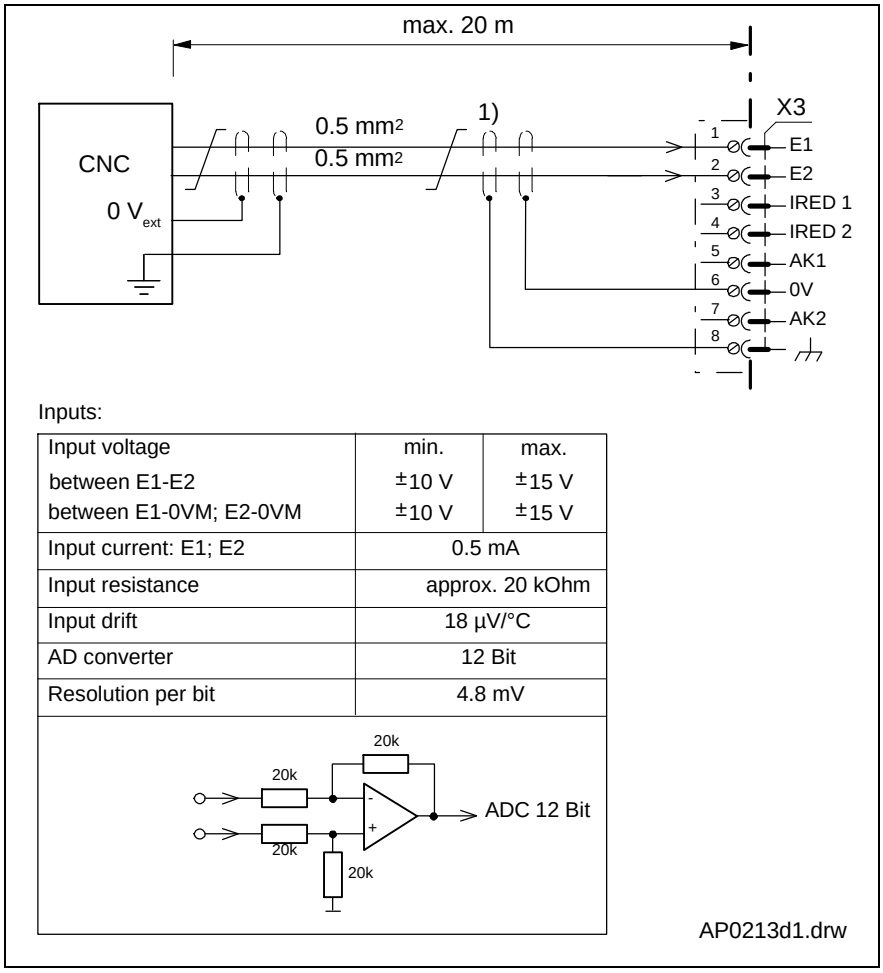


Figure 8-3: Connection Plan for the Analog Torque Interface

8.4 Velocity Supervision in Torque Regulation

When ECODRIVE is used in torque regulation, it supervises the velocity of the motor. If the current actual motor velocity exceeds the velocity limit value by more than 12.5% or a maximum of 100rpms, the drive controller disengages the torque and displays the diagnostic **F879 Velocity Limit Value Exceeded**.

This feature can be used to prevent an undefined accelaration up to the motor's maximum velocity.

Note: The internal velocity supervision in the Torque regulation operating mode does not offer protection for people. External supervision devices and, if necessary, constructive precautions must be taken before personal protection/safety can be guaranteed.

9 General Drive Functions

9.1 Scaling and Mechanical System Data

With **ECODRIVE** it is possible to process position, velocity, and acceleration data with respect to machine kinematics and mechanical transmission elements.

The Scaling/Mechanical System dialog in DriveTop provides all the settings which are necessary to allow machine mechanical systems to work with the drive controller.

Note: Entering the data is only necessary in the "Position control with positioning interface" operating mode. Entering the scaling and mechanical system data is not mandatory in the torque control, velocity control, and position control with step pulse interface operating modes because the adjustments prescribed by these parameters take place in the superordinate machine control. However, entering this data in the operating mode can be advantageous because the DRIVE-TOP diagnostic window will show the position and speed output variables scaled in units appropriate for the application.

Linear Scaling

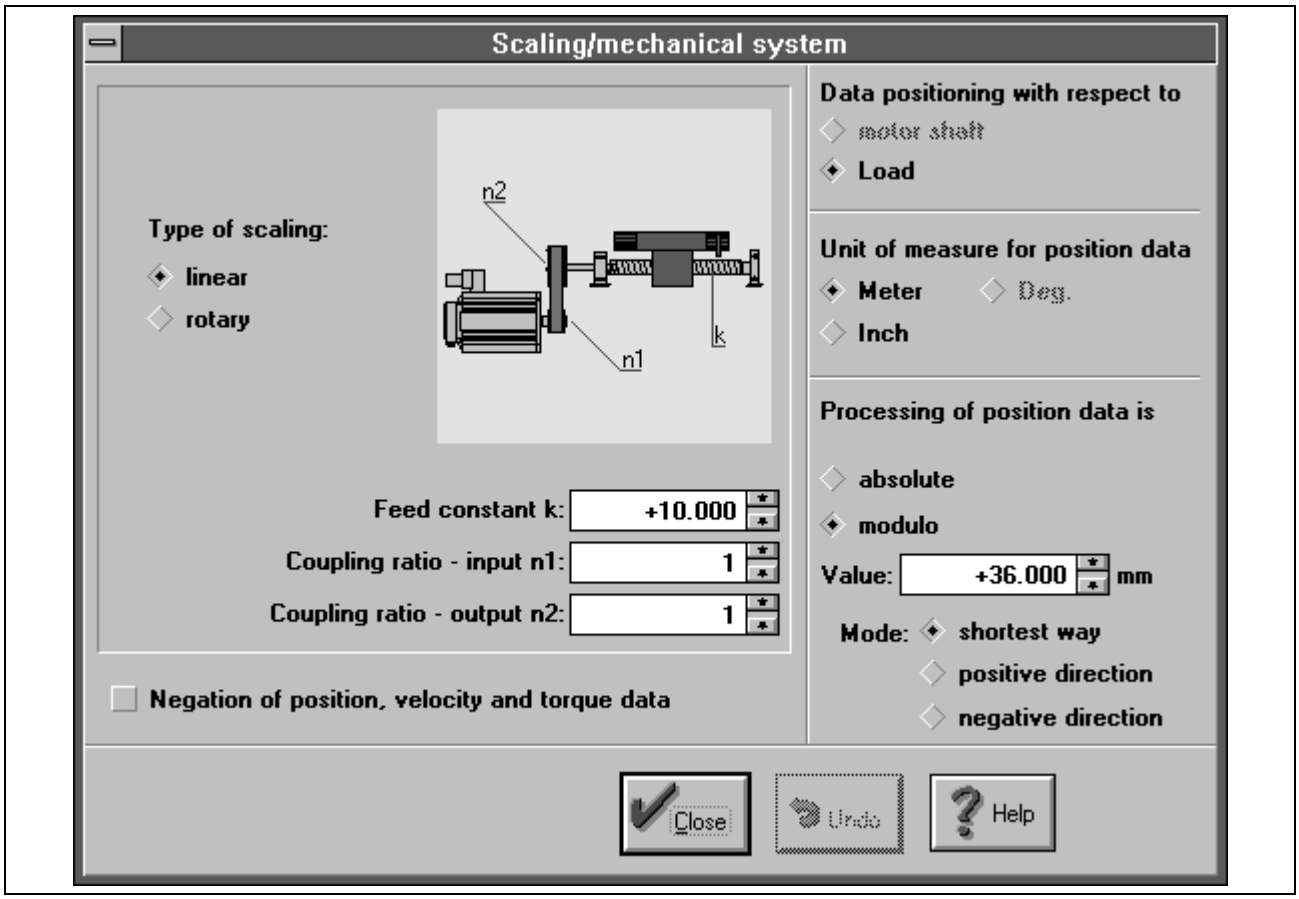


Figure 9-1: Scaling/Mechanical system

In applications where a linear carriage is to be moved, all output variables of the shaft should be entered in linear units and recorded. Linear scaling should be selected and the mechanical data of the shaft entered. (Feed constant, transmission input revolutions, and transmission output revolutions)

A standard arrangement of a mechanical system with a circular rotation shaft is pictured in the diagram. Other similiar mechanical combinations can be derived from this standard configuration.

The feed constant for rack and pinion mechanism can be calculated as follows:

$$\text{Feed advance constant} = \text{effective diameter} \cdot \pi$$

Formula 9-1: Calculation of the feed constant with a rack and pinion mechanism

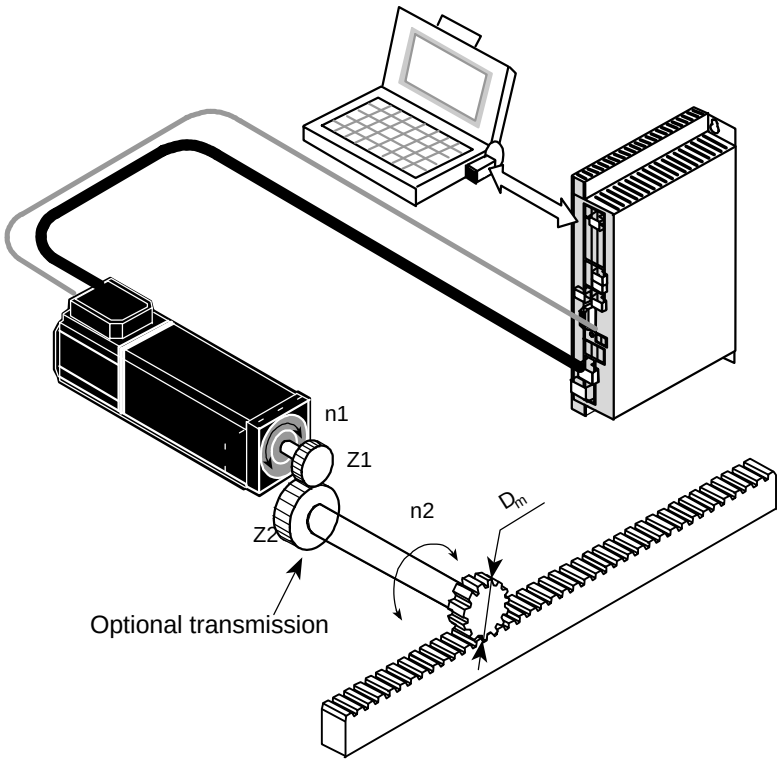


Figure 9-2: Drive system with rack and pinion

The unit of the feed constant to be entered depends on the unit of measure which has been selected for the position data.

Data References

When using linear scaling all output variables such as position, velocity, and acceleration are interpreted in reference to the load.

Units of Measure

When using linear scaling the unit of measure in which position data, velocity data, and acceleration data will be displayed is selectable to be either inch or mm.

The feed constant should be entered in the unit per revolution that has previously been selected.

Example:

Unit of Measure:	mm
Unit for feed constant:	mm/revolution

Negating Position, Velocity, and Torque Data

Position, velocity, and torque data can be negated in order to adapt the output variables to the logical direction of motion of an axis.

Negating this data has absolutely no effect in the control logic sense. Positive feedback in the velocity or position control loops cannot be caused by changing these polarities.

Note: To reverse the direction of motion in the torque control and velocity control modes, exchange the analog input signals (E1-E2).

ROTARY SCALING

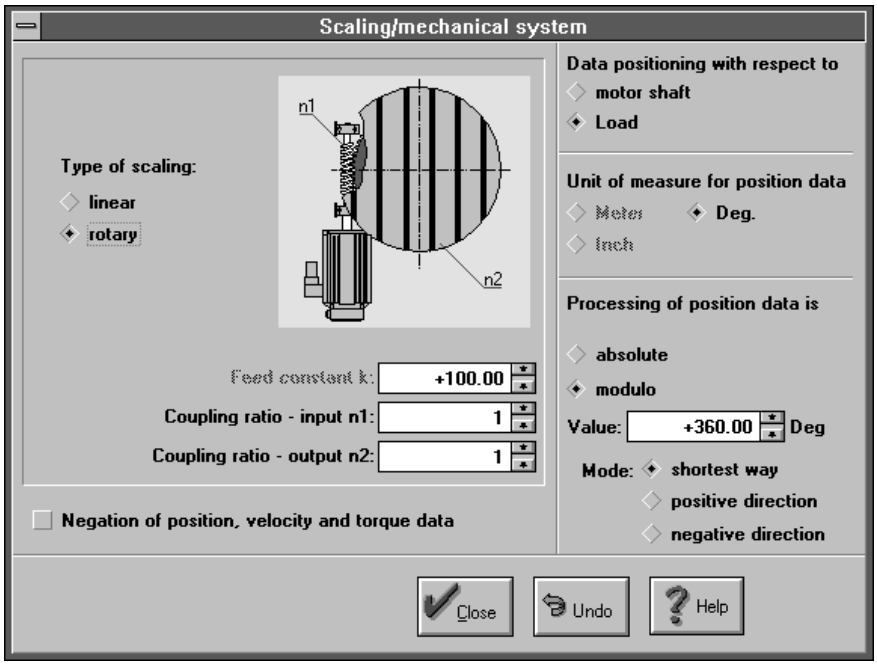


Figure 9-3: Rotary Scaling

In applications where a rotary table **or rotating** shaft is to be driven, all output variables of the shaft should be entered in rotary units. To do this, select rotary scaling and enter the mechanical transmission data of the axis. (Coupling ratio input turns n1 and output turns n2) A standard arrangement for a typical mechanical system is shown in the figure. Other mechanical combinations (such as those with multi-leveled transmissions) can be derived from this standard arrangement. For example, a toothed gear or wheel transmission system can be configured by counting the input wheel teeth Z1 and entering that value in the output turns n2 parameter, and counting the output wheel teeth Z2 and entering that value in the input turns n1 parameter.

$$\text{Mechanical transmission ratio} = n1/n2 = Z2/Z1$$

Data References

The position, velocity, and acceleration data which is displayed can be referenced to either the load side or the motor side in the rotary scaling mode. The load side is normally selected.

Processing Position Data

Position data can be processed in absolute or modulo format.

Absolute Format

Motion in one direction will show a continually ascending or a continually descending position value when processing in absolute format. In other words the position data is displayed as an absolute position over many revolutions of the motor or the load. It overflows at the end of the position data presentation range.

Maximum Presentation Range with Absolute Position Data Processing

The maximum presentation range with absolute position data processing is from - 5461 to + 5461 motor revolutions.

Modulo Format

Position data for shafts or rotary tables which move endlessly in one direction is normally processed in modulo format. This means that the position data overflows at a defined location (at the modulo value).

If modulo processing selected, a "modulo value" must be entered. The position data will then lie within this modulo range. The modulo value of a simple rotary table is normally set at 360°. This means that after one revolution of the round table the position counter will begin again at 0°.

Different modes of modulo processing can be selected:

- **Shortest Path**
  The given target position is always approached via the shortest path. If the distance in a given direction between the actual position and the target position is larger than half of the modulo value, the drive will arrive at the target position from the opposite direction.

- **Positive Direction**
  The given target position is always approached in a positive direction.

- **Negative Direction**
  The given target position is always approached in a negative direction.

Boundary Conditions for Modulo Processing

Several boundary conditions, which are checked in the general parameter test which occurs when switching from parameter mode into operating mode, must be met for proper modulo processing. If necessary, violations of these requirements are displayed with the diagnosis:**C227 Modulo Field Error**.

- The contents of the **S-0-0103 Modulo Value** parameter may not be larger than half of the maximum travel range. The maximum travel range refers to the 4096 motor shaft revolutions.
- The product of S-0-0103 Modulo Value * 4 and **S-0-0121 Input revolutions of load gear** must be smaller than 2^63 with rotary scaling and position data referenced at the load.

9.2 Drive limits

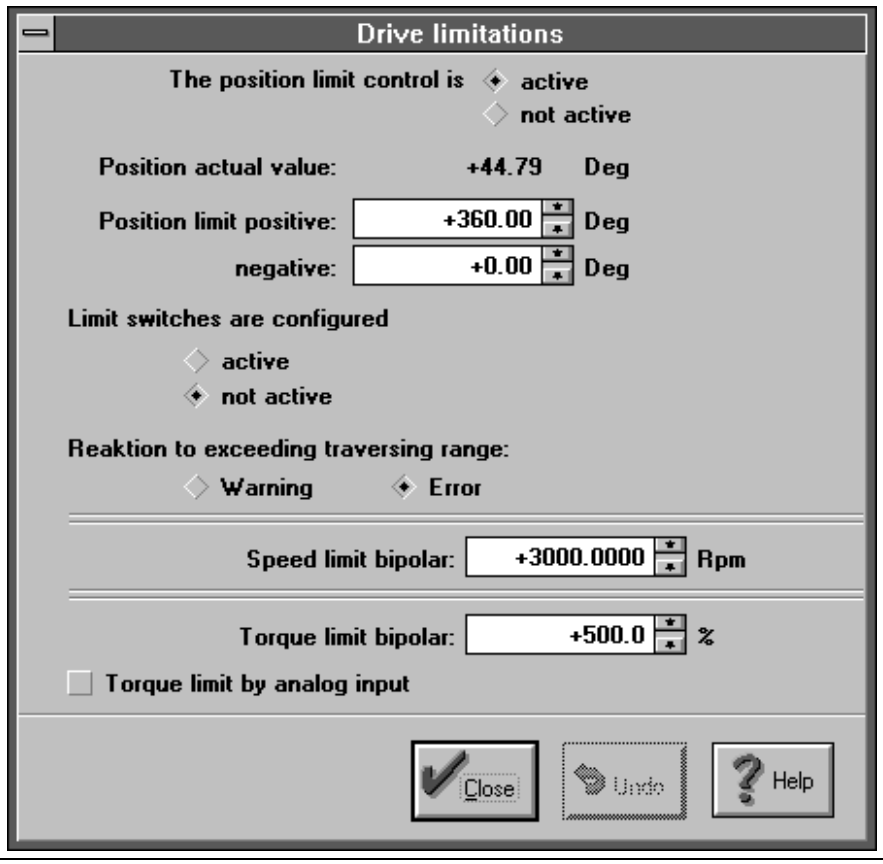


Figure 9-4: Drive limits

Transverse range limits

ECODRIVE provides two internal methods to monitor the travel range of an axis:

- Travel limit switches
- Position limits

A travel region is exceeded when a directional travel limit switch is activated or when a position feedback value referenced to the machine zero point exceeds one of the position limit values.

Activation and Parameters for Position Limit Monitoring

The drive must be homed before the position limit can be monitored.

The position limit monitor can be either activated or deactivated. In particular, the position limit monitor must be deactivated in applications with continually rotating shafts.

The positive and negative position limit values can be independently entered. To assist with setup, the current position feedback value is displayed.

Activation and Parameterization of Travel Limit Switches

Travel limit switches are available to limit the travel range. These limit switches can be activated and deactivated. The logic of the of the limit switch operation can be selected when actively using the limit switches. (Limit switch inputs may be configured to be either active high or active low.)

Connecting the Travel Limit Switch

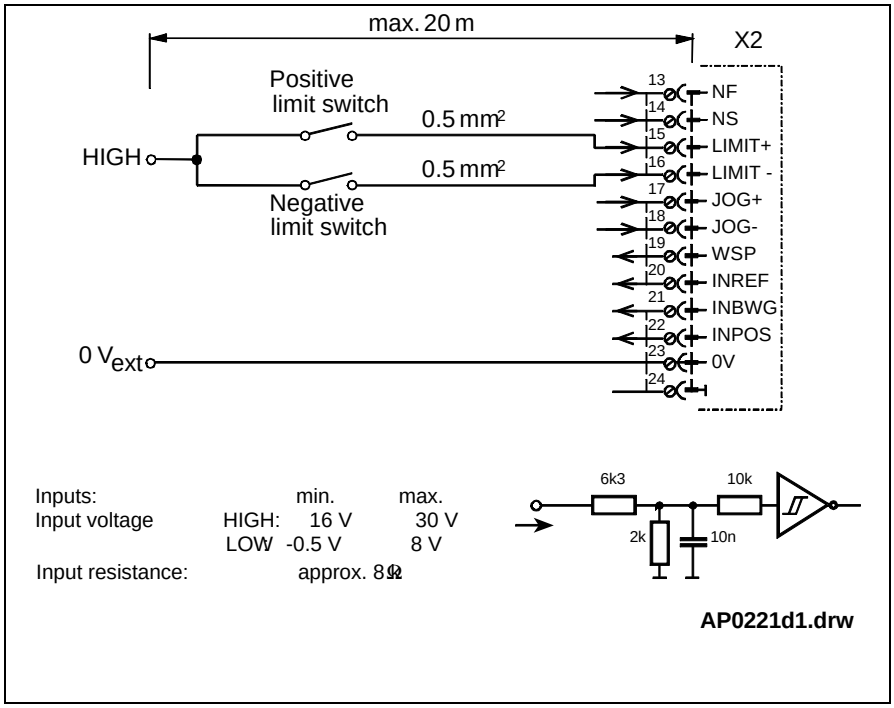


Figure 9-5: Connecting the travel limit switches

Reaction to Traverse Range Violations

The drive has several responses to going beyond the traverse range. The following responses can be selected:

Traverse Range Violations as a Warning Response

The drive reacts to going beyond the traverse range by switching the velocity command value to zero without turning off the control enable and without opening the bb-contact. The warning is automatically recalled when command values are given which lead to the proper traversing range.

Traversing Range Violations as an Error Response

The drive reacts to going beyond the traverse range by switching the velocity command value to zero, automatically turning off the controller enable, and opening the bb-contact. To resume operation, clear the error, turn on the mains power supply, and enable the controller again. As long as the traverse range is exceeded, only command values which lead back into the proper tradverse range will be accepted. Command values outside of this range result in another error.

Limiting the Velocity

The maximum velocity to be reached by the drive can be set via the bipolar velocity limit value parameter. If the requested velocity is greater than this limit, the drive will automatically contain the velocity at the limit value.

Limiting Velocity in Torque Regulation Mode

In the torque regulation mode the velocity is monitored at 1.125 times the value of the given limit. If this value is exceeded, the drive switches to a torque free state. If the motor has a brake it will be applied. The following error message will be given:

- F879 Velocity Limit Value Exceeded in Torque Regulation Mode

Torque Limits

In order to protect the components of the machine, it may be necessary to reduce the maximum torque of the drive. There are two ways to do this:

- Permanently limiting torque via parameters
- Variable limits via an analog torque reduction input

Limiting Torque via Parameter

The maximum torque to b**e** produced by the control drive can be set via the bipolar torque limit value parameter. This value is to be entered proportionally. One hundred percent corresponds to the torque produced by the motor in the use at a standstill.

Limiting Torque Via Analog Input

The effective peak torque can be continuously reduced via the analog torque reduction input.

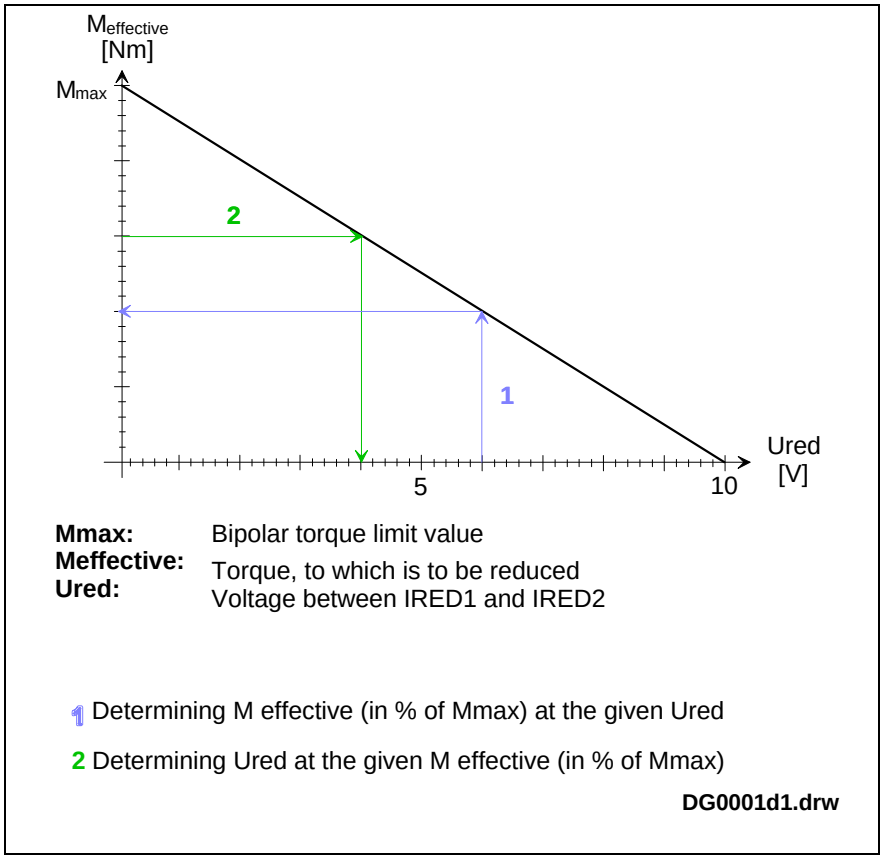


Figure 9-6:Diagram for determining torque reduction

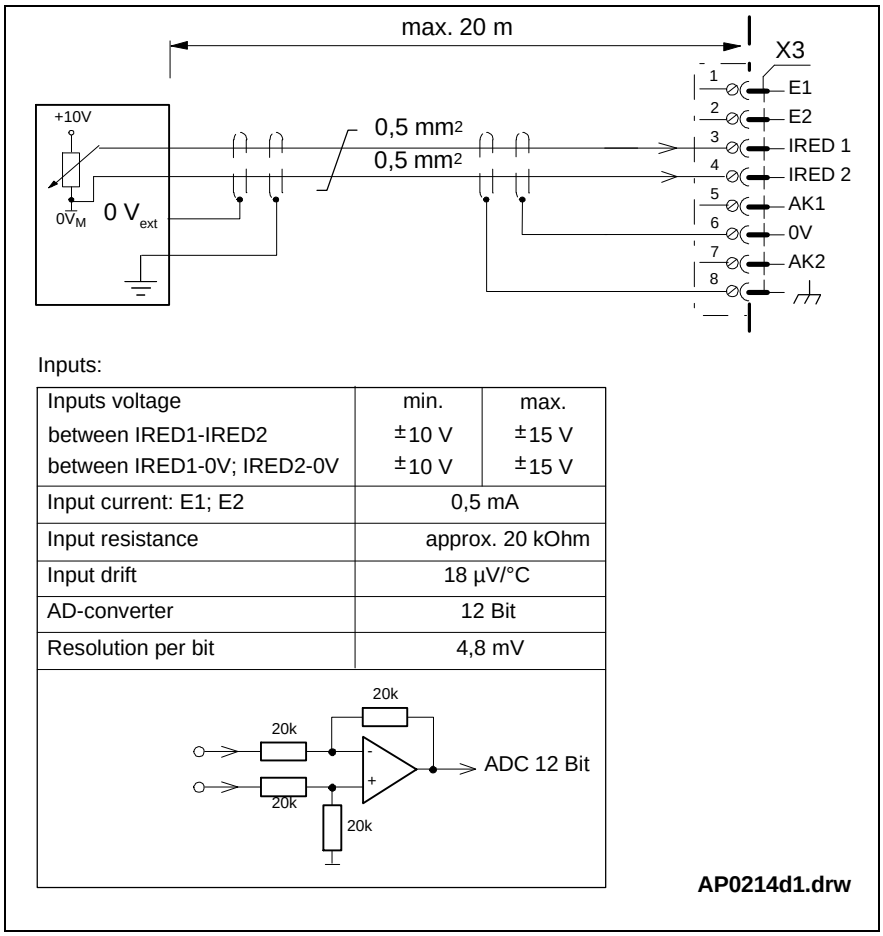


Figure 9-7:Connecting the analog torque reduction

9.3 Error Handling

Many functions are monitored in connection with operating modes and parameter settings of the drive. If a condition is recognized which will not allow proper functioning of the drive, an error message is generated and the drive will automatically respond to the error.

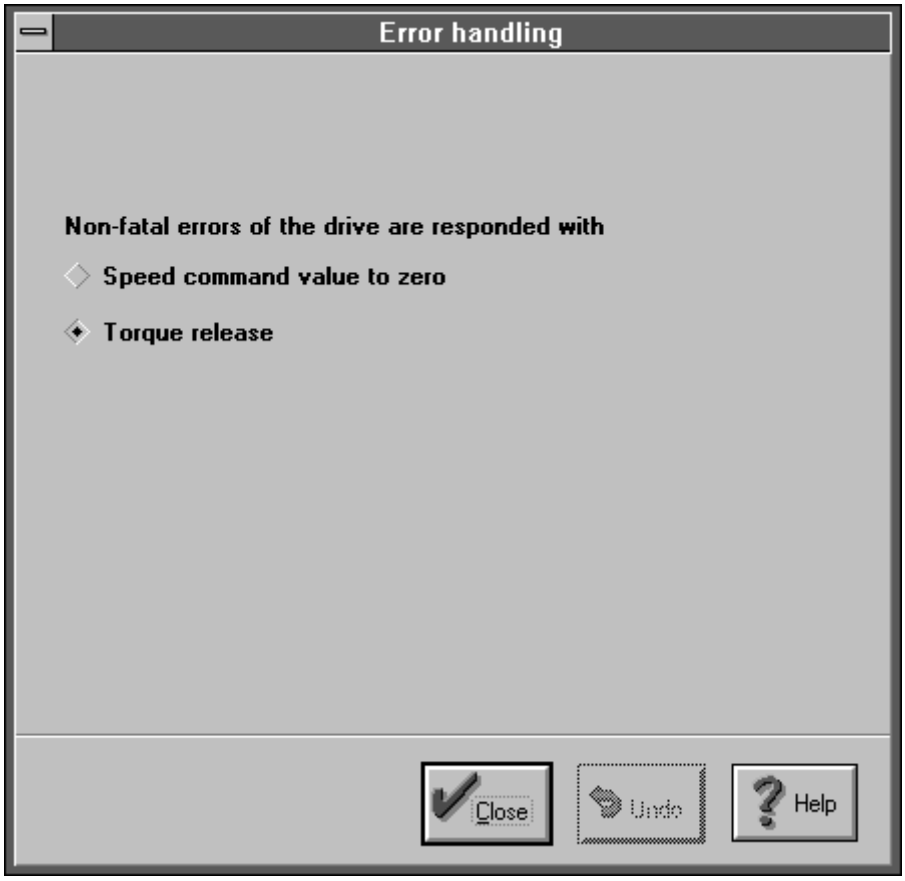


Figure 9-8: Error handling

Error Classes

Errors are divided into different classes:

Error Class	7-Segment Display Message	Drive Response
Fatal	F8 / xx	Switch to torque free state
Traverserange	F6 / xx	Velocity command value set to zero
Interface	F4 / xx	may be selected
Non-fatal	F2 / xx	may be selected

Figure 9-9: Error Classes

Drive Response

If the drive is in controlled mode and an error is detected, an error response is automatically carried out. An alternating indicator is visible on the H1 display (Fx / xx).

If the error allows for a variable response, either **switching to a torque free state** or **setting the velocity control value to zero** can be selected as the error response. After the drive has responded to the error it will automatically switch to a torque free state and open theinternal Bb ready-to-operate relay.

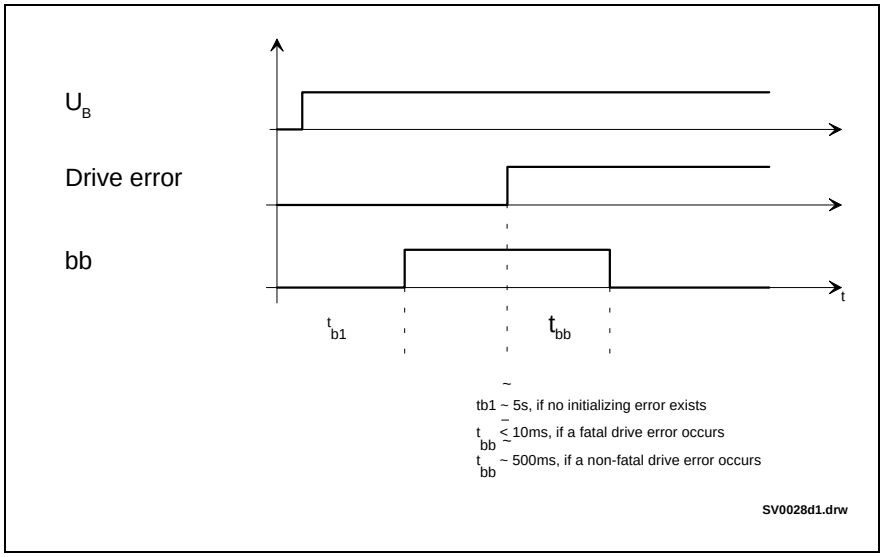


Figure 9-10: bb-Timing when switching on the supply voltage

9.4 Selecting the Control Loop Settings

General Information for Selecting the Control Loop Settings

The control loop settings in a digital drive controller are important for the performance characteristics of the servo axis. Determining the control loop settings requires expert knowledge.

"Optimizing" the control settings is usually not necessary!

For this reason, all INDRAMAT digital drive controllers have application specific control parameters.

For some exceptions, however, it may be necessary to adjust the control loop settings for a specific application. The following section gives a few simple, but important, rules for setting the control loop parameters in cases such as these.

In each situation the prescribed methods should only be viewed as guidelines which lead to a robust control setting. Specific aspects of some applications may require settings which deviate from these guidelines.

Loading Default Parameters

The **Load Default Parameter** function can activate defined control parameters. The parameters are determined for a matched moment of inertia relationship of $J_{motor} = J_{load}$. These parameters will work with standard applications.

Default values exist for the following parameters:

- S-0-0106, Current Loop Proportional Gain
- S-0-0107, Current Loop Integral Action Time
- S-0-0100, Velocity Loop Proportional Gain
- S-0-0101, Velocity Loop Integral Action Time
- P-0-0004, Smoothing Time Constant
- S-0-0104, Position Loop KV-Factor
- P-0-1003, Velocity Feedback Value Filter Time Constant

Executing the Basic Load Function After Changing the Motor or Drive Controller

The drive controller will recognize if it is operating with a changed motor type for the first time. The drive will read "UL" on the 7-segment display.

Pressing the S1 key on the drive controller or the reset button in the DRIVETOP diagnostic display will activate the standard control parameters in the drive.

Executing the Basic Load Feature as a Command in the "Regulator Loop Setting" Dialog

The standard control loop parameters can be activated in the "Regulator loop setting" dialog. This can create a stable default condition if the basic tuning valueshas been lost while changing the control settings.

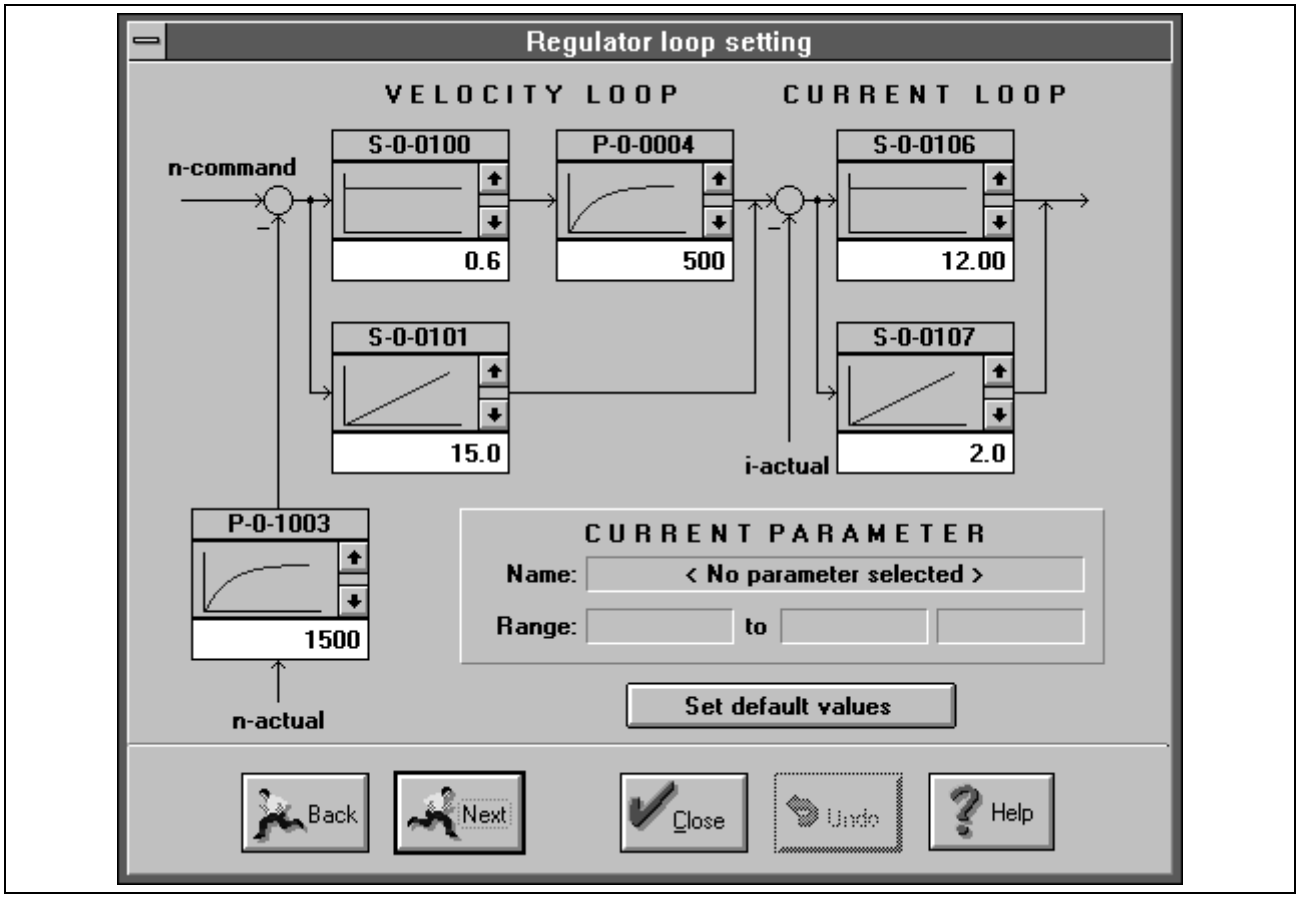


Figure 9-11:Setting standard control parameters

Setting the Current Regulator

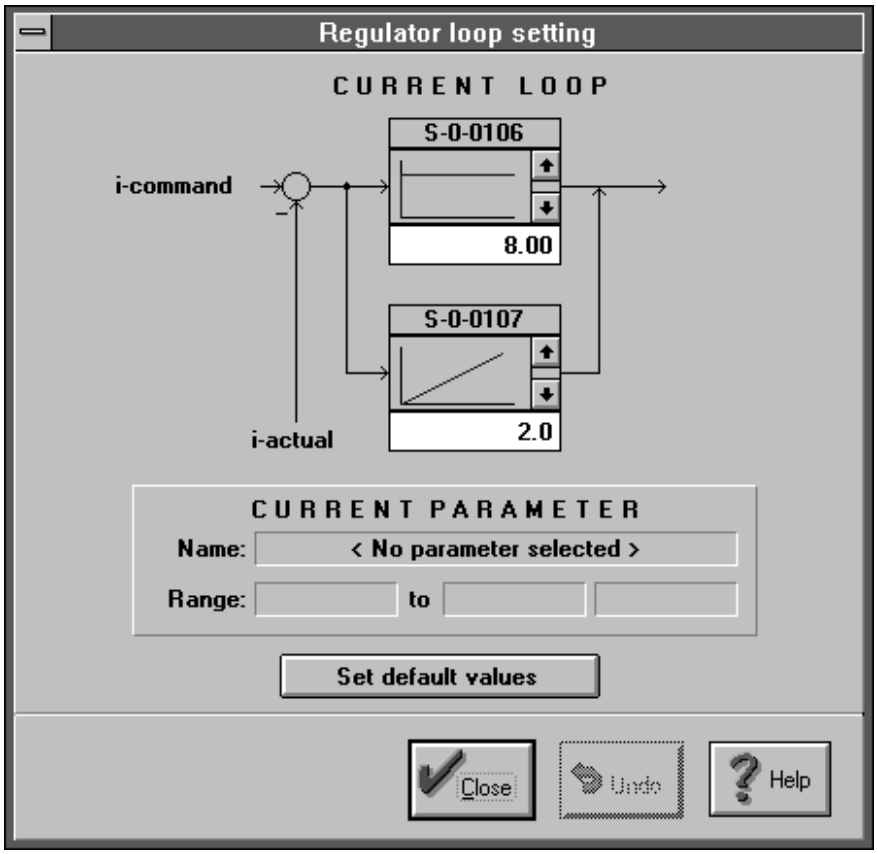


Figure 9-12: Regulator loop settings: current loop

The parameters for the current control loop are set by INDRAMAT and cannot be adjusted for specific applications. The predefined parameter values are set during the basic load command (Set default values).

The parameters for the current regulator are set via the parameters

- **S-0-0106, Proportional Gain 1 Current Regulator**
- **S-0-0107, Current Regulator 1 Integral Action Time**

Note: Any change from the INDRAMAT defined values is unacceptable and can lead to damage to the motor and drive controller.

Setting the Velocity Loop

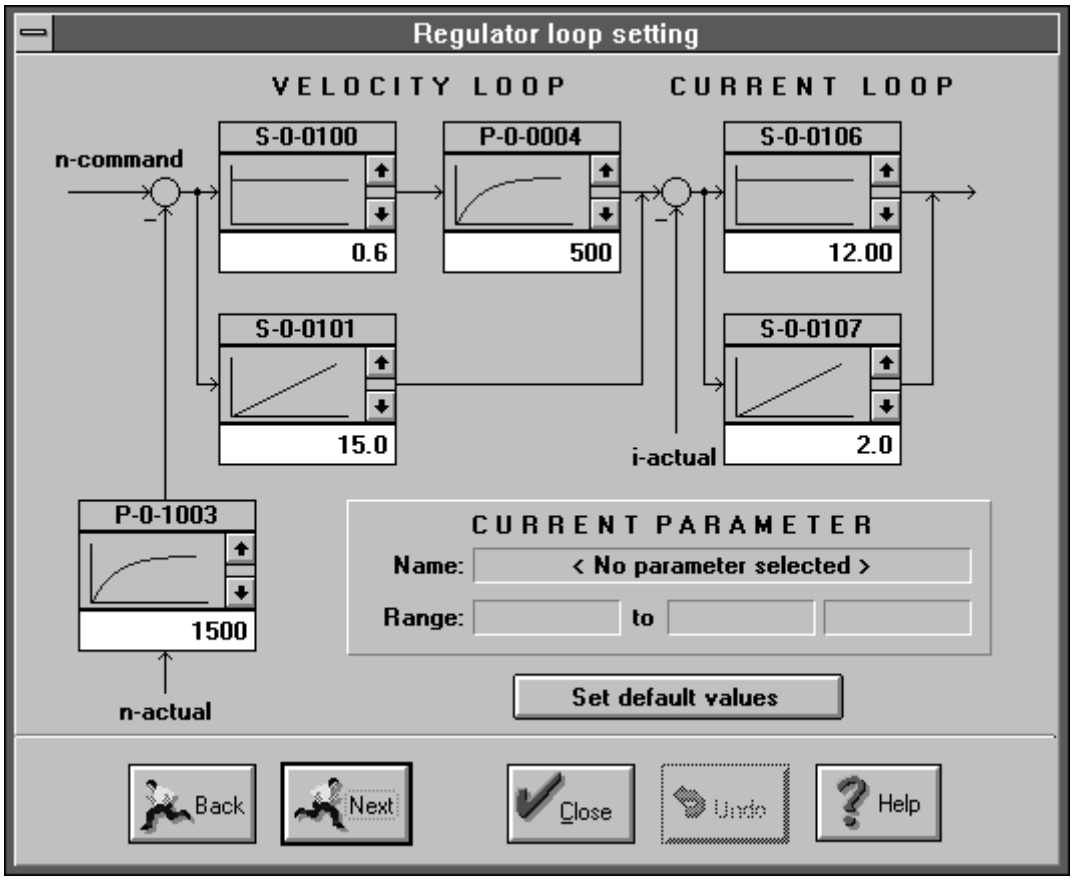


Figure 9-13: Regulator loop settings: velocity loop

The velocity loop is set via the parameters

- **S-0-0100, Velocity Loop Proportional Gain**
- **S-0-0101, Velocity Loop Integral Action Time**
- **P-0-0004, Velocity Loop Smoothing Time Constant**
- **P-0-1003, Velocity Actual Value Smoothing Time Constant**

These can be set by either executing the basic load function once or by completing the following procedure.

Preparations for Setting the Velocity Loop

A number of preparations must be made in order to be able to set the velocity loop:

- The mechanical system must be set up in its final form in order to have true relationships while setting the parameters.
- The drive must be properly connected as described in the user manual.
- The safety limit switches must be checked for proper functioning (if applicable)
- The **velocity regulation** operating mode must be selected in the drive.

Begin the adjustment procedure by setting the following **p**arameters to the indicated values:

S-0-0100, Velocity Loop Proportional Gain = Default value of the connected motor.

S-0-0101, Velocity Loop Integral Action Time = 6500 ms

P-0-0004, Velocity Loop Smoothing Time Constant = Minimum value (500µs)

P-0-1003, Velocity Feedback Value Filter Time Constant = 500µs

Determining the Critical Proportional Gain and P-0-0004, Smoothing Time Constant

- After turning on the controller enable let the drive move at a low speed. (10...20 Rpm)
- Raise the **S-0-0100, Velocity loop proportional gain** until unstable operating behavior (continuous limit cycle oscillations) begins.
- Determine the frequency of the oscillation by measuring the actual velocity with an oscilloscope. When the frequency of the oscillation is substantially higher than 500Hz, raise the **P-0-0004**, **Smoothing Time Constant** until the oscillation goes away. After this, raise the **S-0-0100**, **Velocity Loop Proportional Gain** until it becomes unstable again.
- Reduce the S-0-0100, Velocity loop proportional gain until the oscillation goes away on its own.

The value found using this process is called the **"Critical Velocity Loop Proportional Gain."**

Determining the Critical Integral Action Time

- Set S-0-0100, Velocity Loop Proportional Gain = 0.5 x critical proportional gain. Set S-0-0101 to its default value.
- Lower S-0-0101, Velocity Loop Integral Action Time until unstable operating behavior results.
- Raise S-0-0101, Velocity Loop Integral Action Time until continuous oscillation stops

The value found using this process is called the **"Critical Integral Action Time."**

Determining the Velocity Regulator Loop Setting

The critical value which is determined can be used to derive a control setting which possesses the following characteristics:

- Independent from changes to the axis since there is a large enough safety margin to the stability limits.
- Safe reproduction of the characteristics in production machines.

The following table shows many of the most frequently used application types and the corresponding regulator loop settings.

Application Type:	**Velocity Loop Proportional Gain:**	**Velocity Loop Integral Action Time:**	**Remarks:**
Feed axison standard machines tools	Kp = 0.5 x Kpcrit	Tn = 2 x Tncrit	Good load rigidity and good drive characteristics
Feed axis on perforating machines or punch machines	Kp = 0.8 x Kpcrit	Tn = 6500	High proportional gain; no I-gain to achieve short transient periods.
Feed drive on cut off device	Kp = 0.5 x Kpcrit	Tn = 6500	relatively undynamic control setting without I-gain to avoid bracing the materialto be separated with the separation device.

Figure 9-14: Application specific velocity regulator loop settings

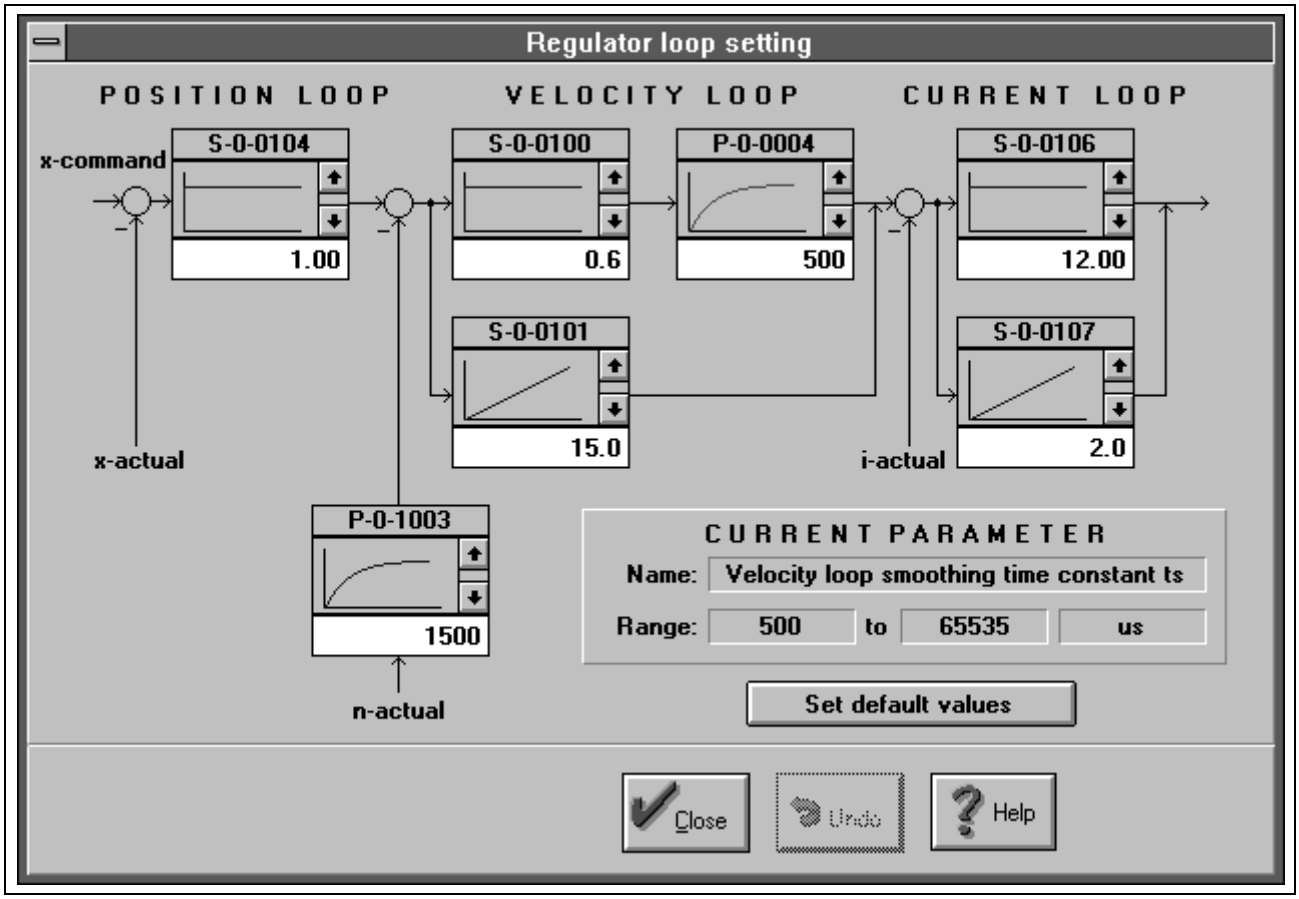


Figure 9-15: Regulator loop setting: Position loop

Setting the position loop is done with the parameter

- **S-0-0104, Position Loop KV-Factor**

This can be set by either executing the basic load function once or by following the process which follows.

Preparations for Setting the Position Control Loop

A number of preparations must be made in order to be able to set the position regulator:

- The mechanical system must be set up in its final form in order to have true relationships while setting the parameters.
- The drive must be properly connected as described in the user manual.
- The safety limit switches must be checked for proper functioning (if applicable)
- The **Position Regulation** operating mode must be selected in the drive controller.
- The underlying velocity controller must be properly adjusted. The beginning value selected for the Kv-factor should be relatively small. (Kv = 1)

Determining the Critical Position Loop Gain

- Run the drive in a mode in which the position regulation loop is closed in the drive.
- Run the shaft at a low speed (10...20 Rpm) via the jog-function of the connected NC-control, for example.
- Raise the Kv-factor until operation begins to be unstable.
- Reduce the Kv-factor until the continuous oscillation disappears by itself.

The Kv-factor determined through this process is the **"Critical Position Regulator Loop Gain"**

Determining the Position Regulator Setting

In most applications an appropriate position regulator setting will lie between 50% and 80% of the critical position regulator loop gain.

This means:

S-0-0104, Position Loop KV-Factor = 0.5 ... 0.8 x Kv_{crit}

9.5 Loop Monitoring

The following loop monitors are provided to ensure that the control drive functions properly:

- Velocity loop monitoring
- Position loop monitoring

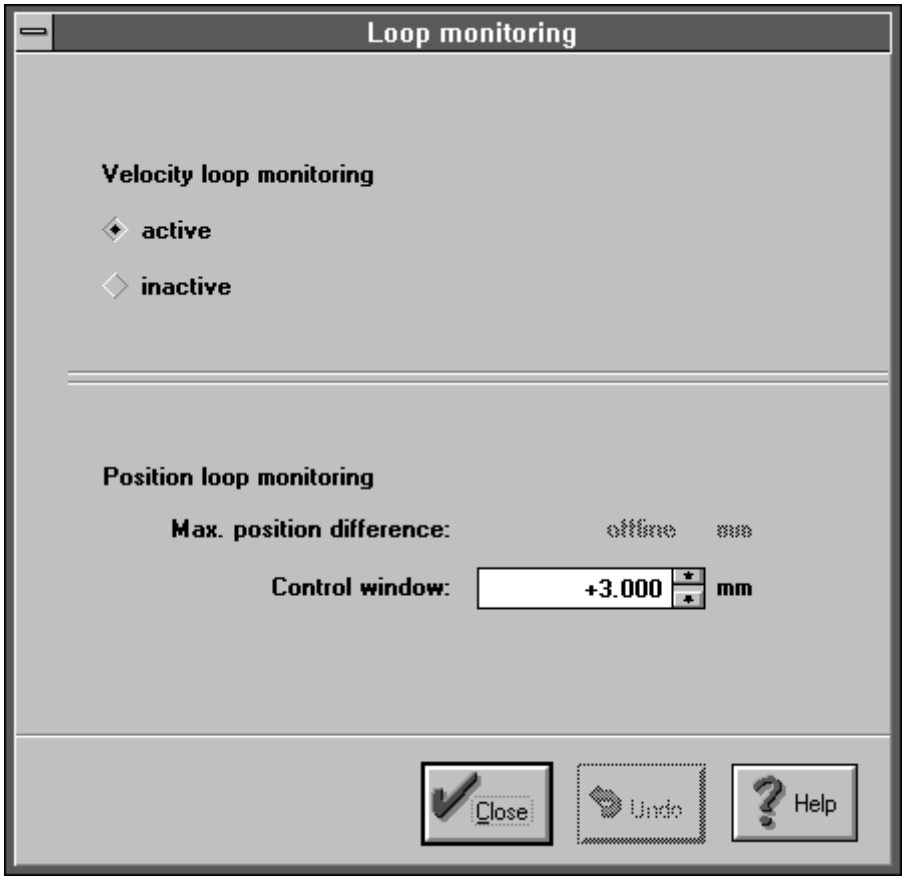


Figure 9-16: Loop Monitoring

Velocity Loop Monitoring

The velocity loop monitor can be activated in the following operating modes:

- Velocity control with analog command value
- Position control with step motor interface
- Position control with positioning interface

Primary Mode of Operation for the Velocity Loop Monitor

The velocity loop monitor functions according to the following principle:

As soon as the peak current limit (peak torque limit) is active, the difference between the velocity command value and the velocity actual value is checked to see if it is larger than 10% of the maximum motor velocity. If this is the case, the velocity loop monitor checks to see if the control drive is accelerating in the given direction. The velocity loop monitor will react , over a time period of 20ms, an acceleration in the opposite direction is not detected.

Possible reasons for triggering the velocity loop monitor:

- Faulty wiring in the motor power cables
- Defect in the power supply of the control drive
- Defect in the feedback system
- Insufficient gain in the velocity regulator parameters

Deactivating the Velocity Loop Monitor

DANGER

Control drive errors or faulty wiring can lead to uncontrollable shaft movements.

⇒ The velocity loop monitor should be activated under normal circumstances and should only be deactivated in certain exceptions.

The velocity loop monitor can be deactivated for specific applications in which the control drive is specifically operated at its power limit. (An example: Moving to a positive stop and similar situations)

Position Loop Monitoring

The position loop monitor helps to diagnose errors in the position control loop.

Primary Mode of Operation for the Position Loop Monitor

An estimated position feedback value is generated from the position command value. If the difference between the measured and the estimated position feedback value is larger than the value entered in the monitoring window, the control drive will execute its error handling routine according to the parameters which have been set. (see also Error Handling)

Possible Reasons for triggering the position loop monitor:

- Exceeding the torque or acceleration capability of the drive.
- Blocking of the axis mechanical system
- Disruptions in the position feedback
- Exceeding the maximum velocity of the motor by entering too large of a traversing velocity or giving too large of a position command value difference.

Requirements for Setting the Position Loop Monitor Correctly

- Be sure that the velocity and position regulator loops are set properly.
- The axis in question should be checked in regards to its mechanical aspects and should be in its final condition.

Setting the Position Loop Monitor

A typical processing or load cycle should be entered into the connected control system. In so doing the maximum intended velocity and acceleration should be reached.

In the "Maximum position variance" parameter the maximum variance between measured and estimated position feedback values is continually displayed.(Note: The contents of this parameter are not saved on-line; this means that when the power supply is turned on its contents equal zero)

The value determined for the maximum position variance acts as a help for setting the monitoring window. The contents of the "maximum position variance" parameter multiplied by a safety factor are to be set in the "Monitoring window" parameter. A safety factor between 1.5 and 2.0 is recommended.

9.6 Status Message

The current status of the drive can be determined by a superordinate control through different status messages and evaluated for technical control purposes. Four status messages are available in addition to the potential free operating condition contact (Bb) which indicates readiness for use in closed position.

Ready for Work (bb)

The control drive indicates that no internal error is present through the operating condition contact "Bb". After the supply voltage is switched on the control drive initializes itself. If the initialization is successful, the Bb-contact will close after several seconds. After this the mains power supply can be switched on and the control drive can be put into operation.

When an internal error occurs the Bb-contact opens. The time delay between the occurrence of the error and the opening of the Bb-contact depends on the type of error. For fatal errors the contact is opened immediately, while for non-fatal errors the internal error handling routine is executed first.

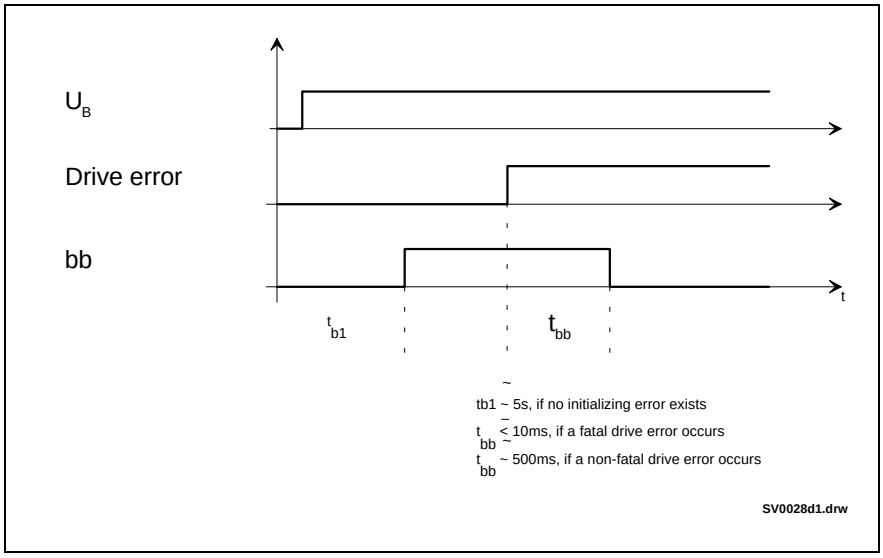


Figure 9-17: bb-Timing when switching on the supply voltage

In Position (INPOS)

The message "INPOS" applies for positioning operation and drive controlled homing procedures.

The message "INPOS" is given by the drive if the following requirement has been satisfied:

- The difference between the target position and the actual position is less than the value set in the position window parameter.

This message can help a superordinate control system determine the correct completion of a positioning command.

Note: The INPOS message defaults to being inactive during jogging and when the controller enable is switched off.

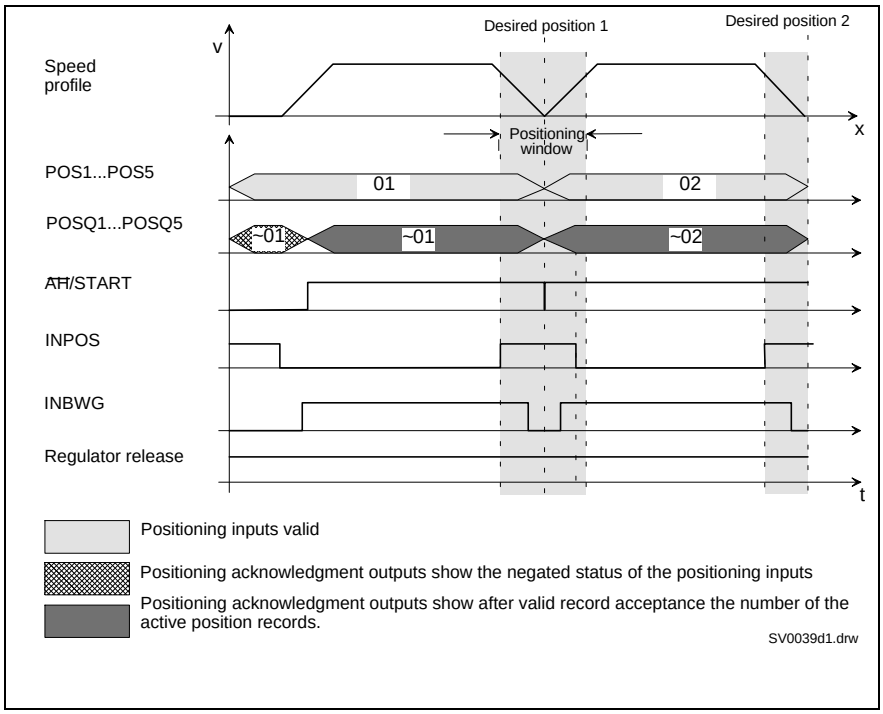


Figure 9-18: INPOS message response during positioning procedures

Note: After a positioning command is started, the INPOS message is set to zero at the same time as the output of the command selection acceptance POSQ, as long as the target position has not yet been reached.

In Motion (INBWG)

The INBWG message is given if the drive is moving at a velocity which is larger than the value set in the standstill window parameter.

Note: If an extremely small value is selected for the standstill window, the drive may display INBWG even though it is not in motion. This can be explained by the gradual dissipation of the actual velocity. Entering larger values will solve this problem. (Standstill window = 20 Rpm)

In Reference (INREF)

INREF messages show that the internal position feedback value refers to the machine zero point. The INREF message has the following properties:

- In applications with motors with resolver feedback, the INREF message is only given after successful execution of the drive internally controlled homing procedure.
- In applications with motors with resolver feedback and absolute encoder option, the INREF message is given after the supply voltage is switched on. This requires that the Set Absolute Measurement command has previously been given.

Position Switch Point (WSP)

The DKC has a function for actualizing a position switch point. A switching signal is given at a position set by parameter which can be sent to a PLC for further processing. This enables position-dependent switching functions to be activated. The logic of the position switch point is as follows:

Actual position >
Position switch point function : Path switch point output = 1

Actual position <
Position switch point function : Path switch point output = 0

The path switch point signal can be negated to adapt to a superordinate control.

Note: The position switch point function is only active in control drives which have been homed, because the absolute relationship to the machine's zero point can only be known in a control drive in which the homing procedure has been carried out.

Position Switch Point When Using Motors With Resolver-Feedback (Standard)

Before using the position switch point function the drive controlled homing procedure must be executed.

Position Switch Point When Using Motors with Resolver-Feedback and Absolute Encoder (Optional)

If a switch signal is needed within the travel region of an axis, it is usually realized with a cam actuated switch attached to the machine mechanical system.

By using a motor with absolute encoder (optional) **ECODRIVE** saves the unnecessary expenditure for a mechanical cam switch. When using a motor with absolute encoder the homing procedure is available as soon as the supply voltage is turned on. Consequently, the position switch point signal is also valid and can be used as a replacement for a mechanical cam switch.

Illustration of Status Output Connections

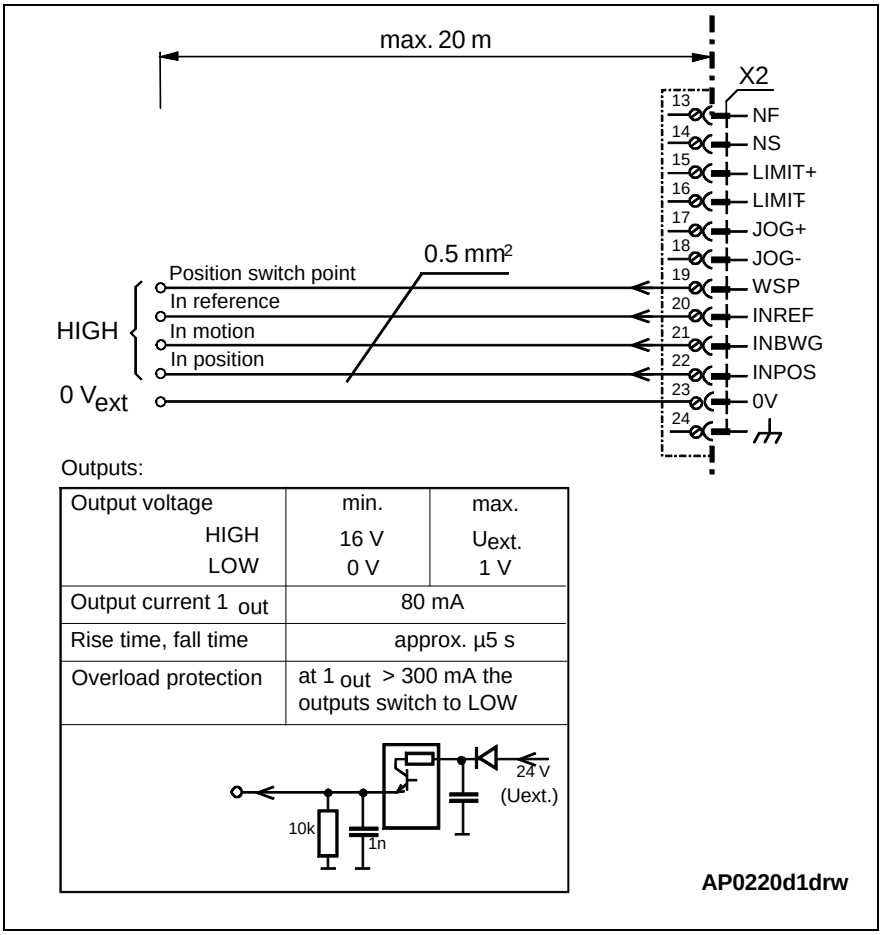


Figure 9-19: Status outputs

9.7 Actual Position Output

The DKC has an actual position value output to transmit the actual position value to a NC-control. Actual position values can be transmitted in either incremental or absolute form.

Incremental Encoder Emulation

Selecting incremental encoder emulation as the actual position output gives out 5V-TTL incremental encoder signals with an adjustable line count value. Incremental actual position value output is possible with both relative position actual value representation as well as with absolute actual position value representation.

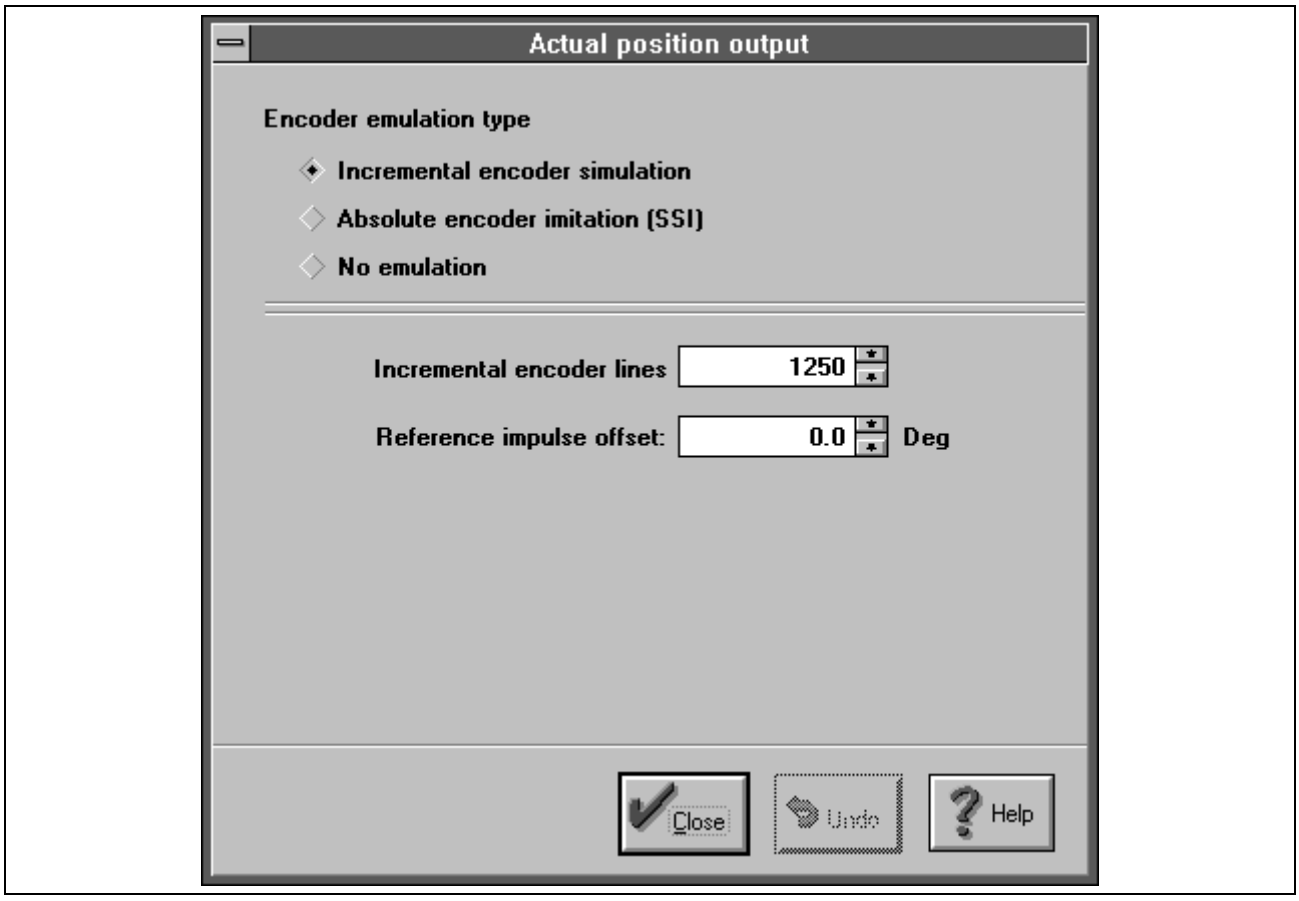


Figure 9-20:Actual position output

Line Count of the Incremental Encoder Emulation

The line count value of the incremental encoder to be emulated determines the number of cycles to be emitted per rotor revolution. This number is equivalent to the graticule line count value which the code plate of a conventional incremental encoder would exhibit.

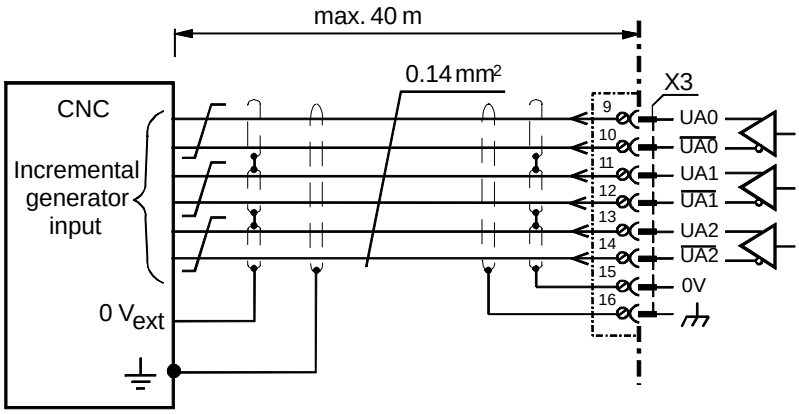
All graticule line count value can be set between 1 and 65536 lines per revolution.

Homing Marker Pulse Offset

The relative position of the homing marker impulse of the incremental encoder to be emulated can be extended with the homing marker pulse offset parameter. Shifting the homing marker pulseis necessary when the position of the home switch switching flank and the homing marker pulsee do not permit a well-defined homing procedure. Controlling the relative position of the homing marker pulse makes the manual adjustment of the home switch cam unnecessary.

The homing marker pulse offset applies to the motor shaft and can be entered in the range from 0 ... 359.9°. A positive offset value shifts the relative position of the homing marker pulse clockwise with respect to the motor shaft keyway.

Illustration of the Incremental Actual Position Value Output Connections



Difference outputs:

Output voltage	min.	max.
HIGH	2.5 V	5 V
LOW	0 V	0.5 V
Output current 1_{out}	max. |20| mA	
Output frequency	max. 504 kHz	
Overload protection	Outputs may not be short circuited! Danger of damage!	

AP0216d1.drw

Figure 9-21: Incremental actual position value output

Absolute Encoder Emulation (SSI)

When absolute encoder emulation is selected, the absolute position value is emitted in the standard SSI-format for absolute position encoders. The absolute actual position value output is only of use when using a motor with absolute encoder (optional).

Absolute position output offers the advantage of making the absolute position of the axis, in reference to a machine home point, available immediately to the connected control after the control voltage has been switched on.

The position which is given out is always in reference to the motor shaft (and cannot be given in reference to the load through mechanical transmission elements).

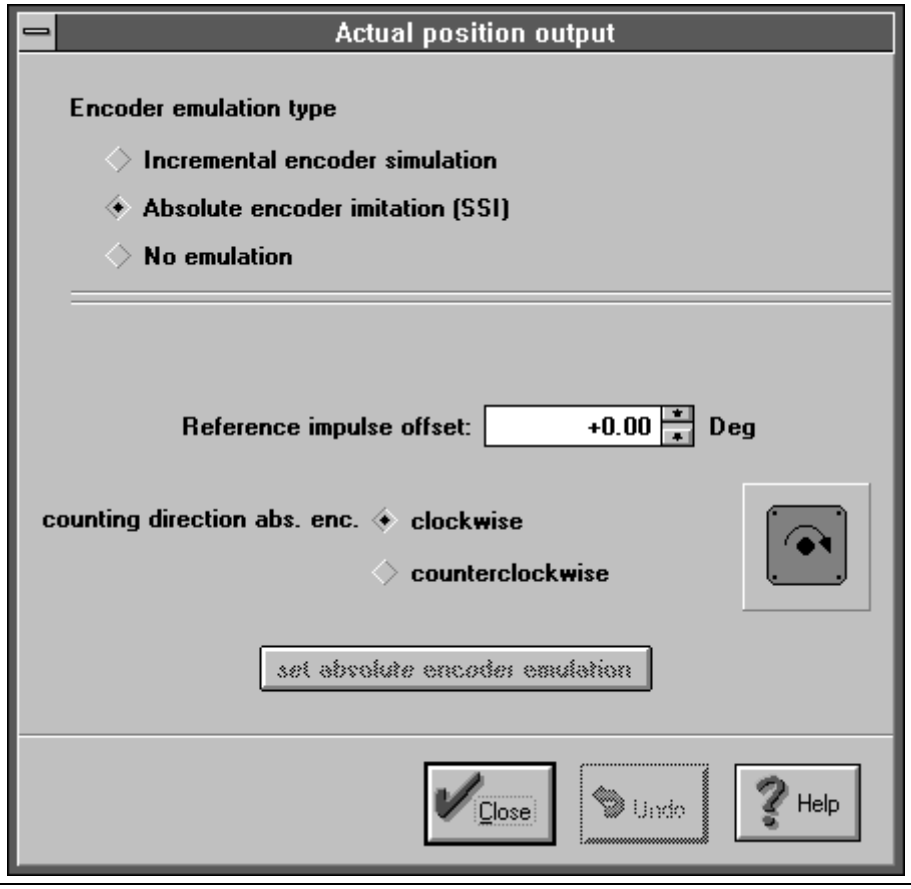


Figure 9-22: Actual position output

Requirements for Using Absolute Encoder Emulation

The NC-control system which is connected must have a SSI input and be able to process SSI data in 25-bit format.

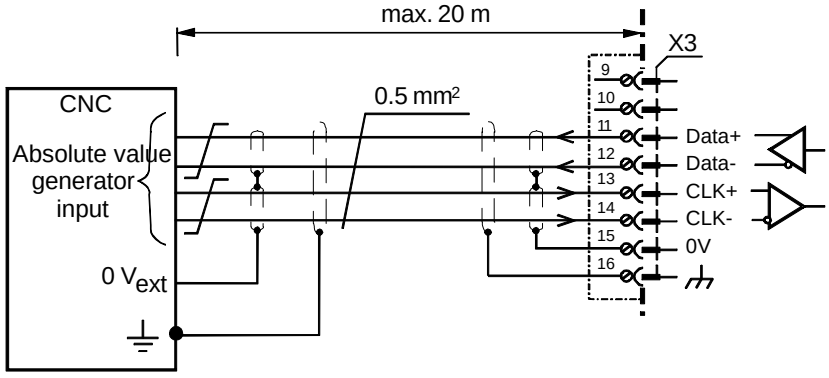
The MKD motor used must be equiped with a multiturn absolute encoder. (Ordering option)

Calibrating the Absolute Encoder Emulation

Setting up the absolute encoder emulation requires a one-time calibration. This calibration procedure is made up of the following steps:

- The polarity of the position information which is transmitted should first be checked for accuracy to prevent positive feedback in the position regulator loop. Additionally, the position display of the connected control system should be watched while moving the shaft at the same time. (The movement can be controlled manually, with the battery box or with the jogging function.) If the position does not change in requisite manner, the output polarity 09 must be reversed with the "Absolute encoder-counting direction" parameter.
- The shaft should be moved to a position known in reference to the machine coordinate system.
- The desired output position should be entered in the "Home position" parameter.
- If the drive is in the desired position, the "Set absolute encoder emulation" command should be selected. Doing this sets the current transmitted position equal to the value given as the home position.

Illustration of Absolute Actual Position Value Output Connections



Difference outputs:

Output voltage	min.	max.
HIGH	2.5 V	5 V
LOW	0 V	0.5 V
Output current 1_{out}	max. |20| mA	
Overload protection	Outputs may not be short circuited! Danger of damage!	

Difference inputs:

Input voltage	min.	max.
HIGH	2 V	5 V
LOW	0 V	0.8 V
Input resistance	12 kOhm	
Clock frequency	(100-1000) kHz	

AP0215d1.drw

Figure 9-23: Absolute actual position value output

9.8 Drive controlled Homing Procedure

In the "Position Control with Positioning Interface" and "Position Control with Step Motor Interface" operating modes the internal homing procedure can establish the measurement relationship to the machine's zero point.

Note: In operating modes with the analog interface the measurement relationship to the machine zero point should be set via the connected control system. Consequently, the "Drive Controlled Homing Procedure" function is not available in these applications.

Homing When Using a Motor With Resolver Feedback (Standard)

Absolute positioning sets and position limit value monitoring can only be used after the drive controlled homing procedure is successfully executed.

The homing procedure should be used in the following situations when using a motor with resolver feedback:

- After turning on the control voltage
- Whenever there is a transition from operating mode to parameterization mode and back to operating mode.

The status message INREF signals to a connected control system that the drive has established a measurement relationship, or, in other words, that the homing procedure was successfully executed. This message must be processed immediately for applications which require a measurement relationship.

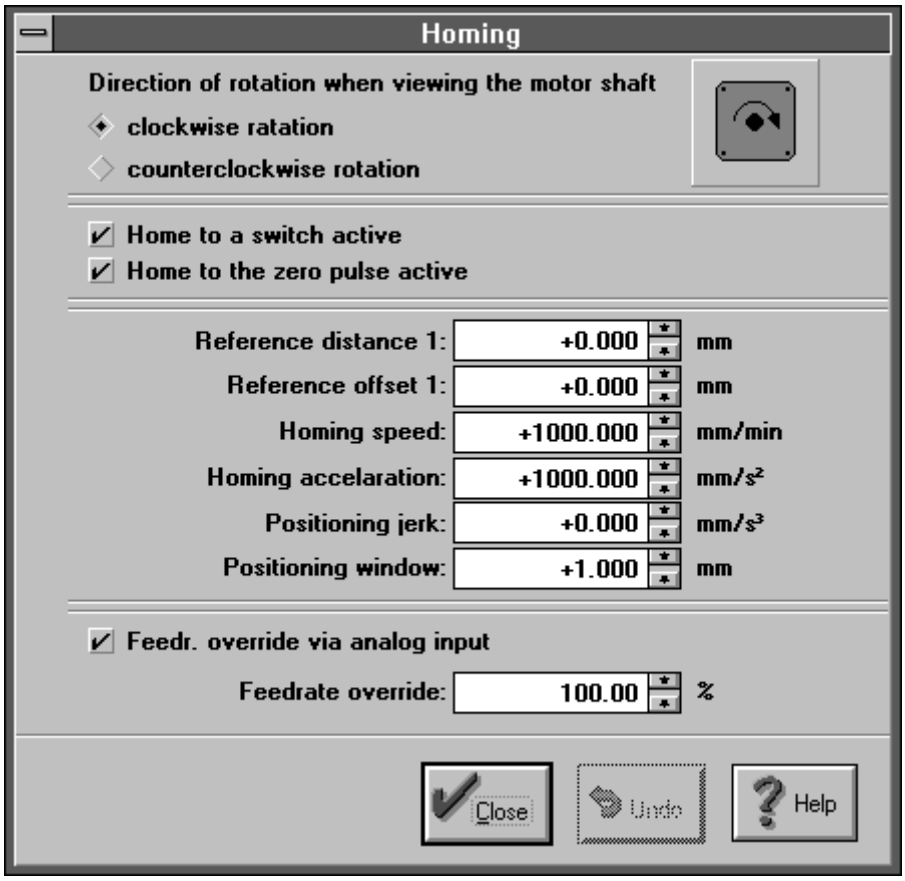


Figure 9-24: Drive controlled homing procedure for motors with resolver feedback

Determining the Direction of Motion During the Homing Procedure

The user must determine the direction of motion for the drive controlled homing procedure in conjunction with the machine mechanical system, the adjustment of the home switch and/or the determination of the home point. This determination always occurs in relation to the motor shaft without regard to the axis mechanical system.

Homing with Evaluation of the Home Switch

The drive is in motion at the specified acceleration and velocity in the home direction until it receives the home switch signal. This point is the home point (or reference point). The control drive will then brake, reverse direction, and move back to the home point.

If the axisis located at the home switch cam at the start of the drive controlled homing procedure, it will move away from the cam until the home switch signal is removed, reverses direction, and head back towards the home switch cam until the edge of the home point switching signal is received.

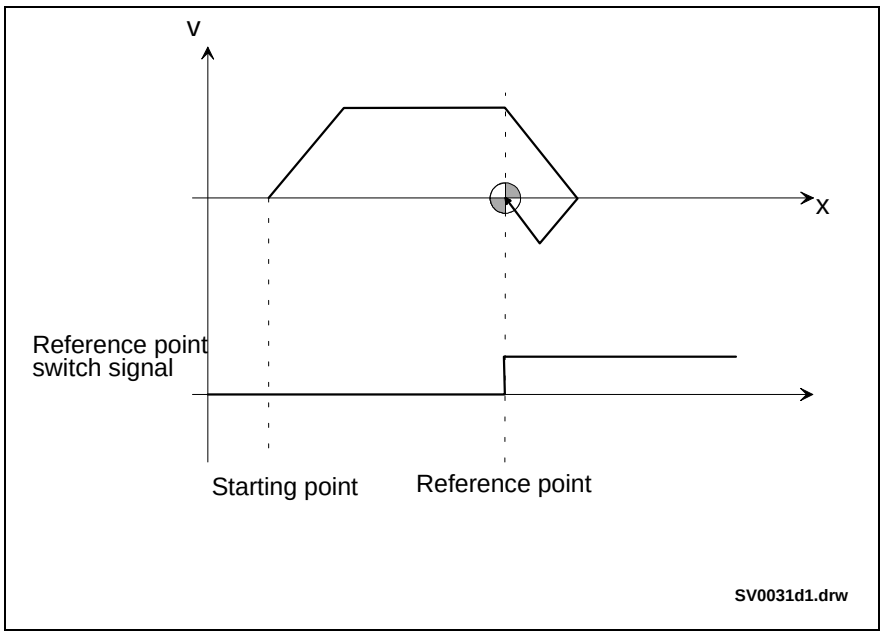


Figure 9-25: Homing with Evaluation of the Home Switch

Homing with Evaluation of the Position Encoder Homing Mark

The drive moves at the specified acceleration and velocity in the home direction and positions itself on the next homing Mark of the motor encoder. This point is the home point.

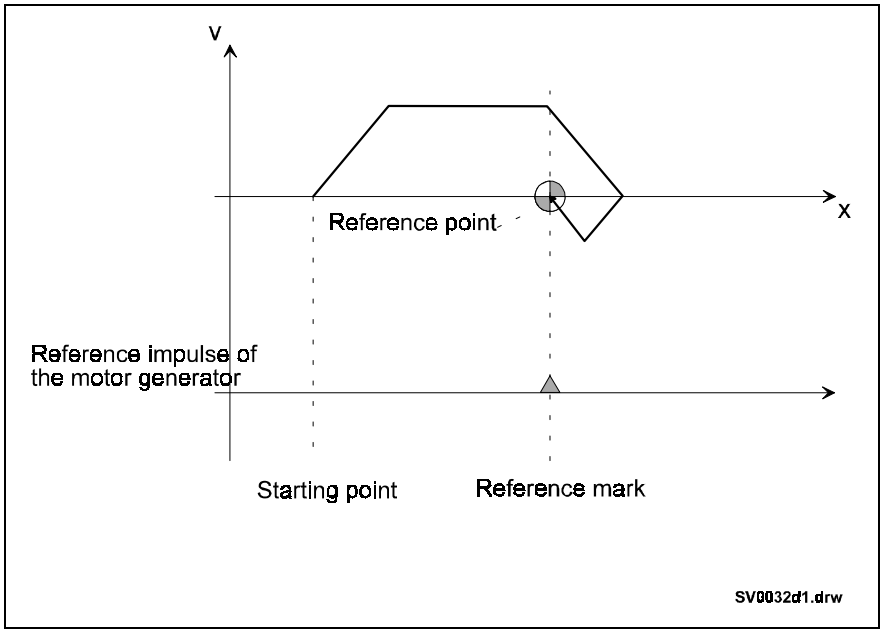


Figure 9-26: Homing with evaluation of the position transmitter homing mark

Note: Multiple homing marker pulses per motor revolution will appear with MKD motors:

- MKD025 / MKD041: 3 homing marks
- MKD071 / MKD090 / MKD112: 4 homing marks

Homing With Evaluation of the Home Switch and the Home Mark

The drive moves in the home direction until it receives the home switch signal. The control drive then positions itself on the next motor encoder homing mark which appears. This point is the home point.

If the axis is on the home switch cam at the start of the drive controlled homing procedure, it will first move away from the cam until the home switch signal is removed, reverse direction, and head back again in the direction of the home switch cam to find the home point.

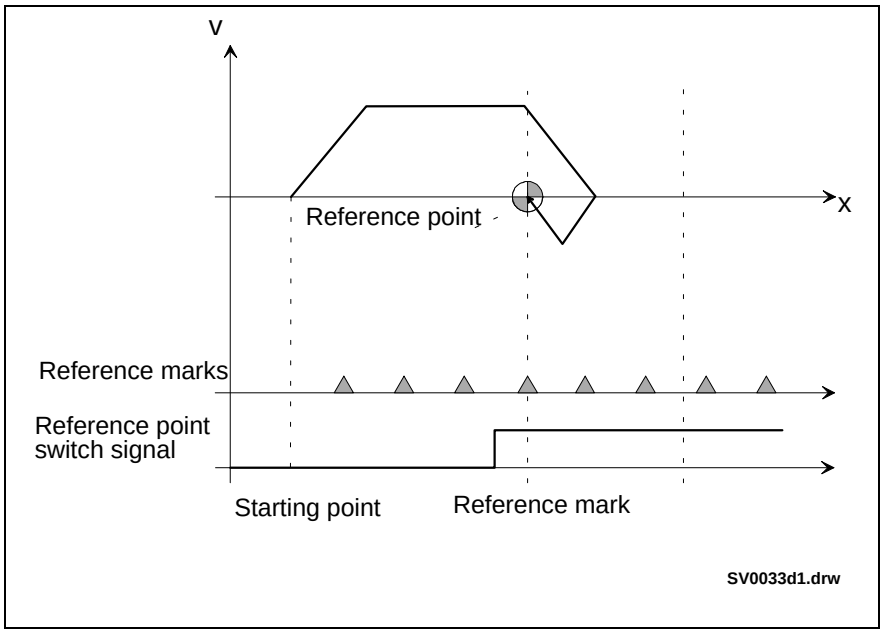


Figure 9-27: Homing with evaluation of the home switch and the home mark

Note: The homing velocity may not be greater than 1000 Rpm (in reference to the motor shaft); if it is greater the position of the home switch signal and the home reference of the motor transmitter will not be able to be unambiguously calculated.

Homing to the Current Actual Value

The control drive is not in motion. The actual position value is set equal to the value of the "Reference Distance 1" parameter immediately after the homing procedure is activated.

Homing Parameters

Reference Distance 1

When the internal homing procedure is finished the control drive positions itself on the home point and enters the value of the "Reference Distance 1" parameter in the current actual position value.

Reference Offset 1

The home point can be offset in relation to the home reference of the motor encoder via this parameter.

When the motor is attached to a specific mechanical system the home mark of the motor encoder is in an arbitrary position with respect to the desired home point. Zero should initially be entered in the reference offset parameter when setting up. After the first homing attempt, calculate the difference between the desired home point and the position where the control drive stops at the end of the first homing procedure.

This value should be entered in the Reference Offset 1 parameter, while paying attention to its sign. After another homing procedure the control drive will be in the desired home position.

Homing velocity, Homing acceleration and Positioning Jerk

These parameters determine the motion profile of the control drive while executing the drive controlled homing procedure. These parameters must be set for each specific application.

Positioning Window

The drive must be positioned on the home point at the end of the homing process. If the control drive moves around the home point within the positioning window, the control drive will recognize the successful completion of the homing procedure and will display the INREF (In Reference) message.

Note: The "Positioning Window" parameter is also used in connection with the positioning sets.

Override Feature with the Drive Control Homing Procedure

The velocity at which the control drive moves during the homing procedure can be controlled with the feedrate override feature. The value in the "Feedrate override" parameter determines at what proportional velocity, in relation to the programmed homing velocity, the drive should move. In other words, at 100% the control drive will move at 100% of the homing velocity value.

A continual reduction of the velocity can be made via the analog command value input. To do this the "Feedrate-Override Variable via Analog Input" field must be activated.

Detailed information on this can be found in the chapter "Feedrate Override Function."

Home Switch Configuration

The home switch cam should be configured as shown the figure shown below to ensure that the homing procedure can be started from any position in the transversing range.

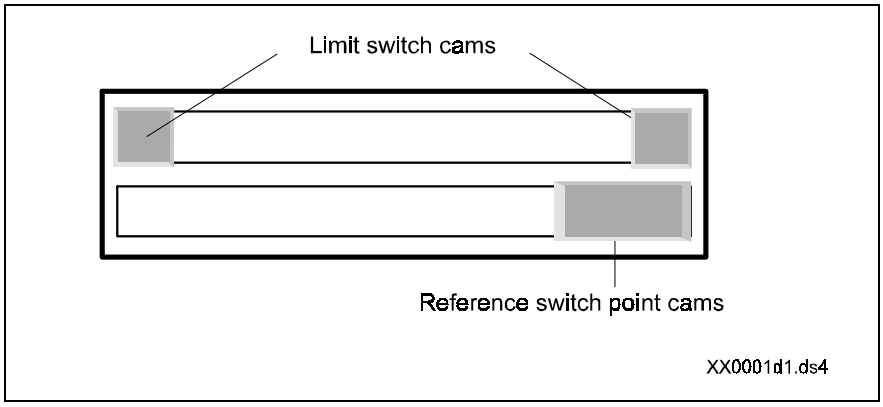


Figure 9-28: Configuration of the home switch cam

Connecting the Home Command and Home Switch Inputs

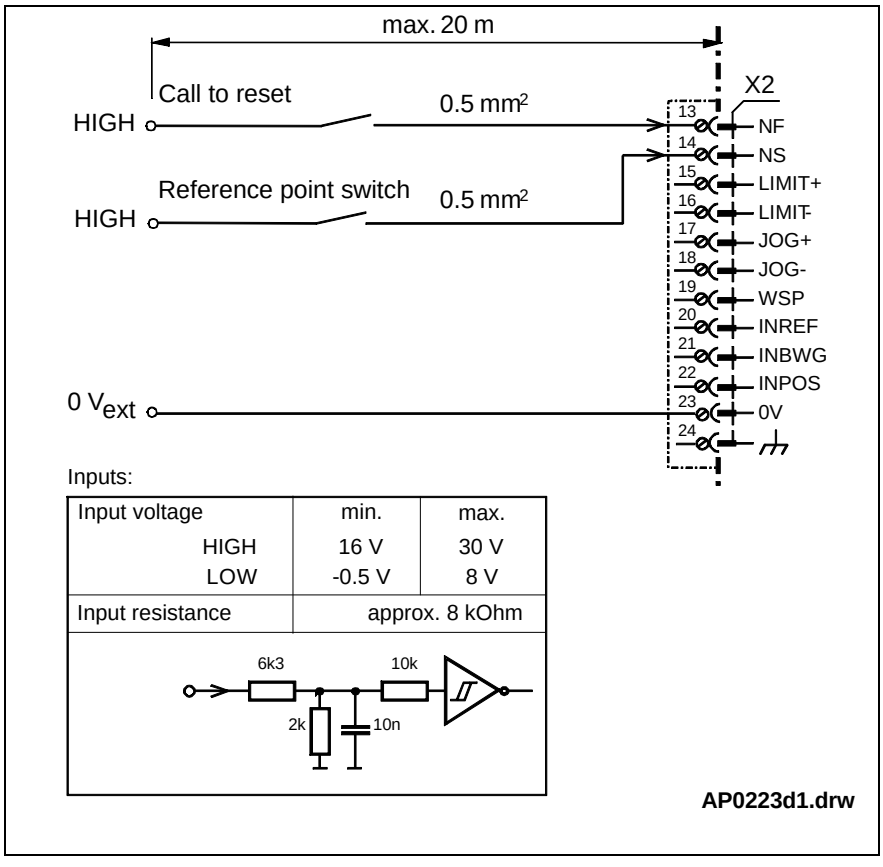


Figure 9-29: Connecting the home command and switch inputs

Ending the Drive Controlled Homing Procedure

The homing procedure can be interrupted by the following series of signals:

The homing procedure is selected at the NF signal input. Activating the START-signal begins the homing procedure. After successful complete of the procedure the message INREF (In Reference) is given. Deactivating the NFsignal and the AH/STARTsignal can terminate the homing procedure.

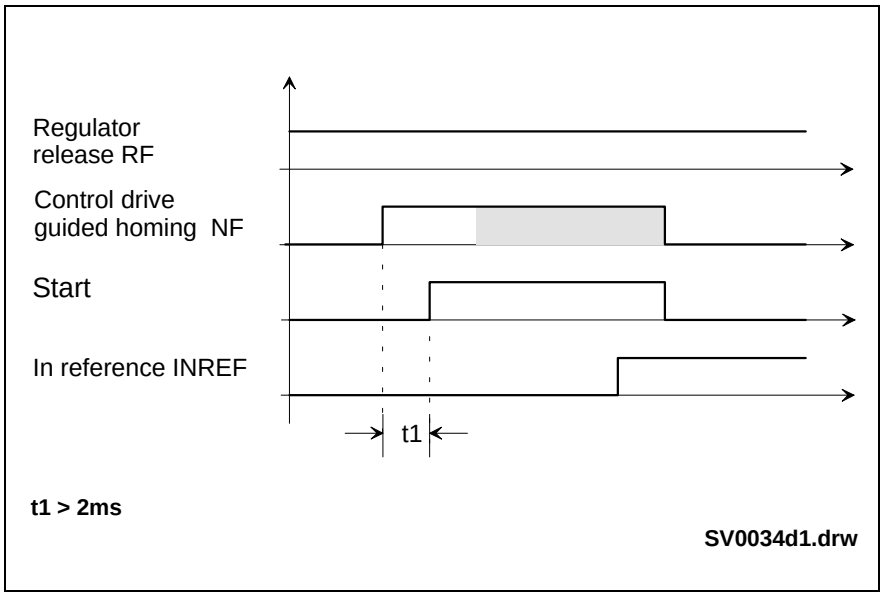


Figure 9-30: Drive controlled homing procedure

Homing When Using a Motor With Integrated Absolute Encoder Function (Optional)

When using a motor with an integrated absolute encoder function (optional) the measurement relationship is available immediately after turning on the supply voltage, assuming that the "Set Absolute Measure" was executed during the initial installation.

This enables execution of absolute process blocks without a homing procedure immediately after the supply voltage is switched on.

The status message INREF (In Reference) signals to the connected control system that the drive has a measurement relationship to the machine zero point.

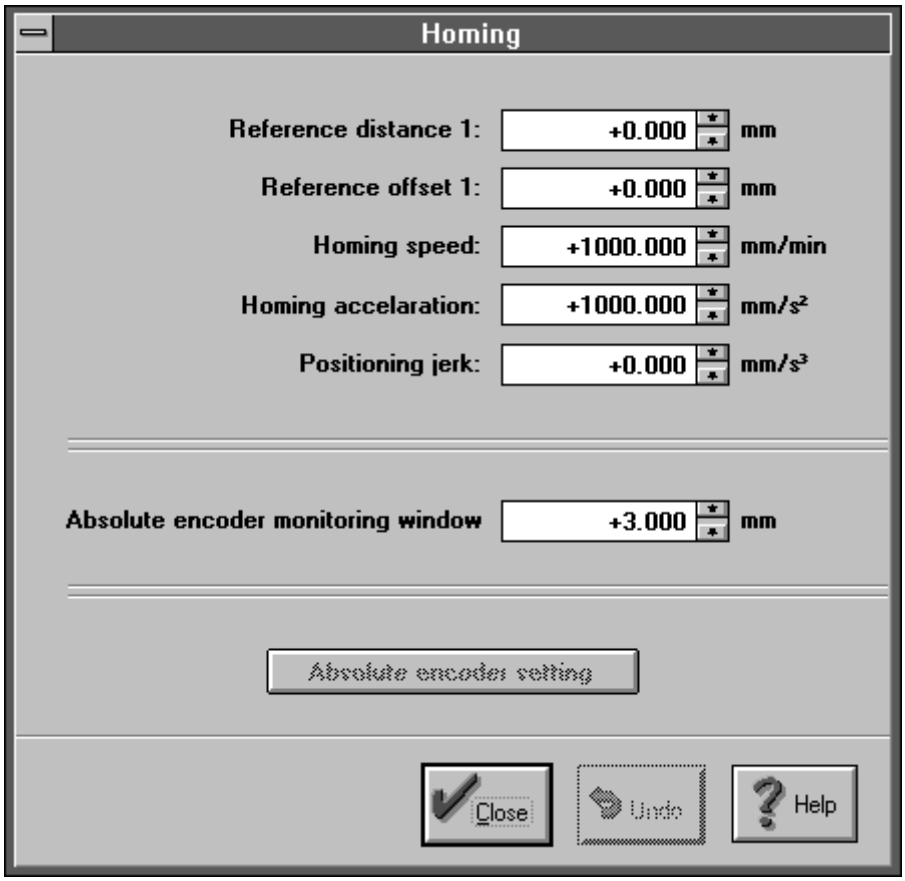


Figure 9-31: Drive controlled homing procedure with a motor with integrated absolute encoderfunction

Setting the Absolute Position

The relationship to the machine mechanical system (the machine zero point) must be established when a axis is initially installed with a motor with an absolute value encoder (optional). This is done by following these steps:

- Move the motor to a position known in relation to the machine zero point either via the jogging function or manually.
- Enter the value in the "Reference Distance 1" parameter which should be given as the actual position value of this known position.
- Enter 0 in the "Reference Offset 1" parameter.
- Press the "Set Absolute Measure" button.

After the "Set Absolute Measure" command is executed, the current actual position value is set equal to the value which is entered in the "Reference Distance 1" parameter, as long as the controller enable is currently deactivated. If the controller enable is active the calculation for accepting the homing position is made. The actual acceptance of the homing value in the actual position value occur only after the control enable is deactivated.

Moving Towards the Home Position

In the "Position Control with Step Motor Interface" operating mode it may be helpful to activate drive motion towards the home position via an external switching signal. Doing this makes executing a homing procedure for the stepping motor control unnecessary.

The velocity, acceleration, and jerk with which motion to the home position should be carried out can be entered via the appropriate homing motion parameters.

The drivedrive moves to the home position when the "NF" signal is set and the start signal is given. This requires that the control drive has been homed, or, in other words, that the "Set Absolute Measure" command has been successfully executed.

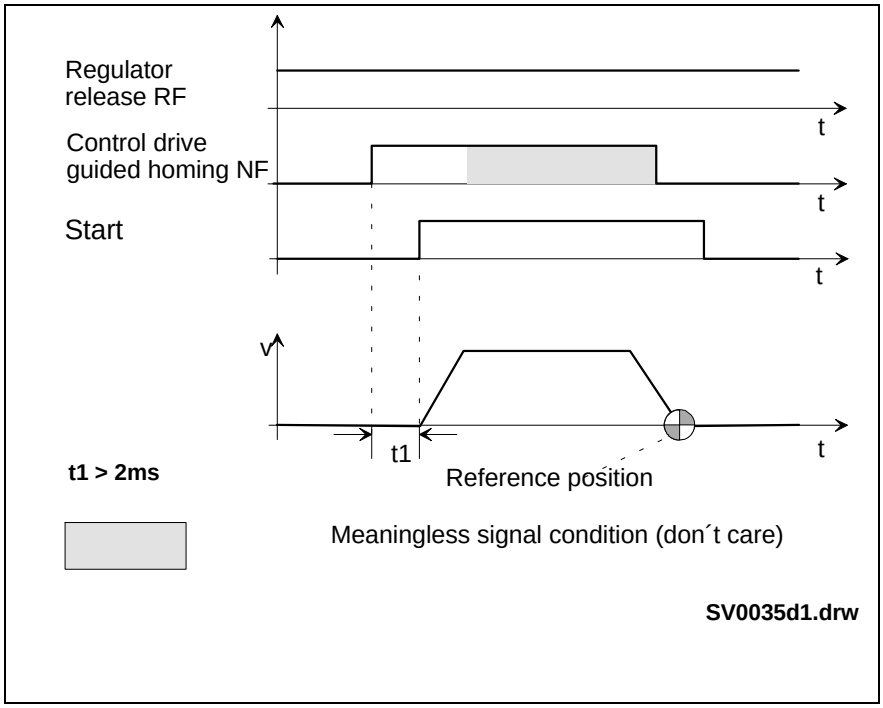


Figure 9-32: Moving towards the home position

Absolute EncoderMonitoring

To ensure the safety of the absolute encoder function, the DKC has a monitoring system which can recognize errors in determining the absolute actual position value. The current actual position is saved when the DKC supply voltage is turned off. When it is turned on again the actual position which was saved is compared to the current motor position as read from the motor encoder. If the difference between the two position values is greater than the value entered in the "Absolute Transmitter Monitoring Window" parameter, the error message **F276 Absolute Transmitter Error** is given.

Different circumstances can trigger that absolute encoder monitor:

- The shaft was moved while the control drive was turned off.
- The motor encoder is showinga function error.

Setting the Absolute Encoder Monitoring Window

The value for the absolute encoder monitoring window must be determined specifically for each application. It should be selected such that possible movements of the shaft while the power is turned off are taken into account so that the monitor is not unnecessarily activated.

9.9 Jogging

The axis can be moved with the jog function in the "Position Control with Step Motor Interface" and "Position Control with Positioning Interface" operating modes. The parameters relevant to the jog function can be entered in the "Jog" dialog.

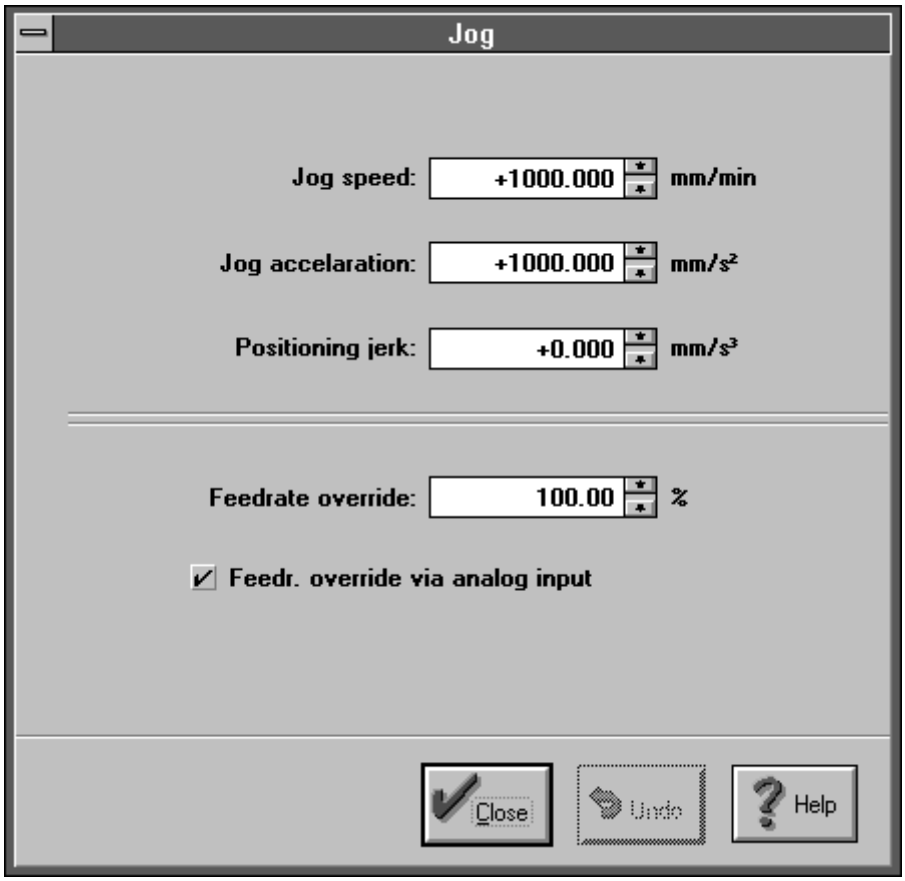


Figure 9-33: Entering the jogging parameters

Override Feature While Jogging

Note: The speed at which the control drive moves while jogging can be controlled with the feedrate override feature.

Detailed information on this can be found in the chapter "Feedrate Override Function."

9.10 Feedrate Override Function

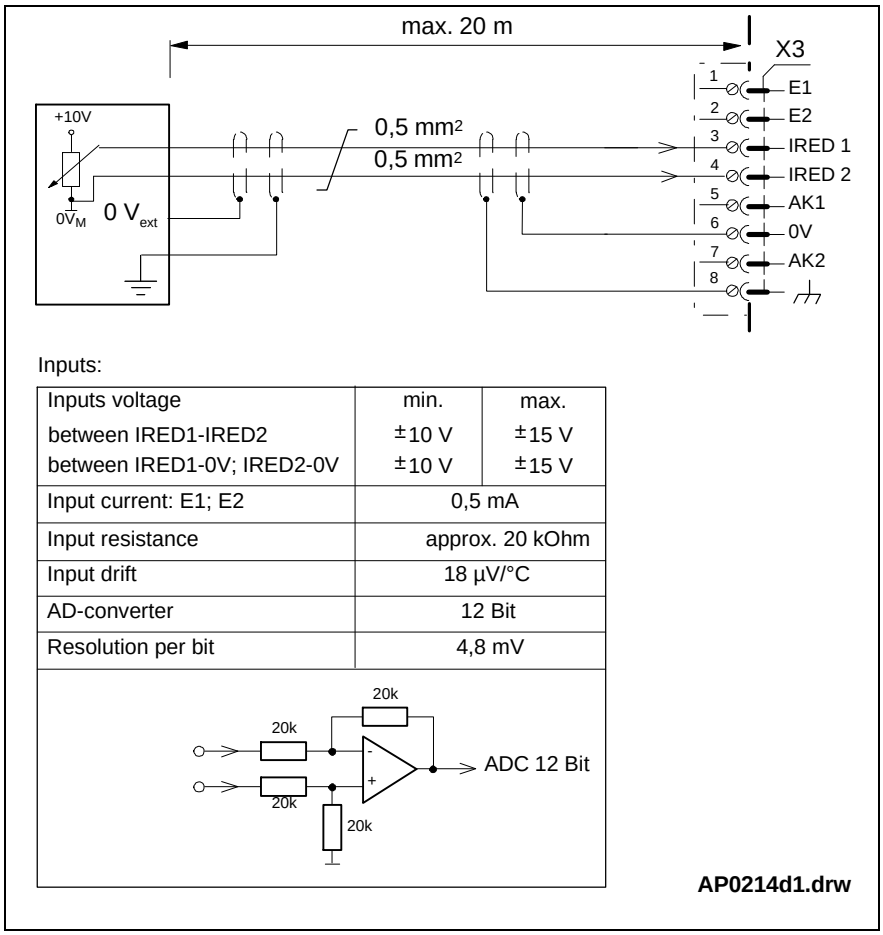
The velocity of the positioning sets, the homing velocity, and the jogging velocity are controlled by the feedrate override function. The "Feedrate override" parameter determines at what velocity, in proportional relation to the programmed velocity, the drive should move. In other words, at 100% the drive will move at precisely the programmed velocity.

A continuous reduction of the positioning velocity can be made via the analog command value input. To do this the "Feedrate-Override Variable via Analog Input" field must be activated. To convert the voltage at the analog input use:

0Volt: Velocity = 0

10Volt: Velocity = Velocity determined proportionally via the override factor

Connection of the Analog Override Signal



Inputs:

Inputs voltage	min.	max.
between IRED1-IRED2	±10 V	±15 V
between IRED1-0V; IRED2-0V	±10 V	±15 V
Input current: E1; E2	0,5 mA	
Input resistance	approx. 20 kOhm	
Input drift	18 µV/°C	
AD-converter	12 Bit	
Resolution per bit	4,8 mV	

Figure 9-34: Connection of the analog override signal

9.11 Analog Output

DKC drives operate digitally. This means that all output variables are available as digital information from the DKC. The DKC has two analog diagnostic outputs to make velocity values, speed values, current values, etc. visible via an oscilloscope.

The selection of the output signals include the following values:

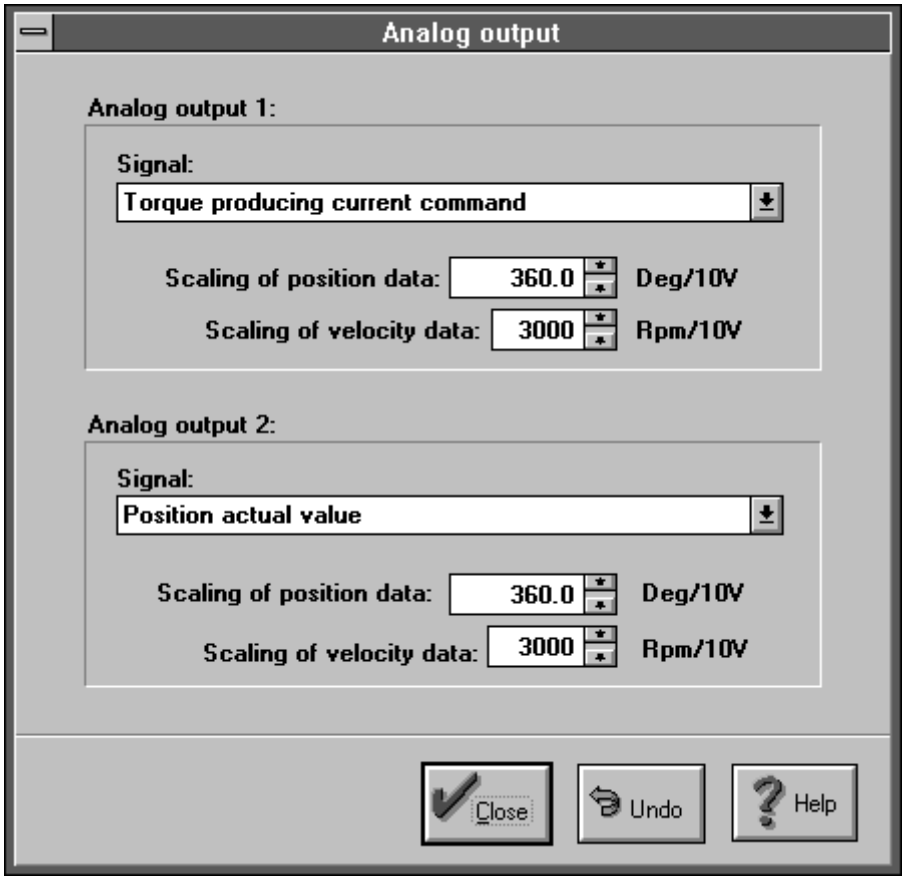


Figure 9-35: Analog output

Signal selection	Scaling	Notes
Current command value	10V = Unit type current	DKC01.1-040-7:Type current = 40A DKC01.1-030-3:Type current = 30A
Velocity actual value	Scaleable	
Velocity command value	Scaleable	
Actual position value	Scaleable	
Motor feedback sine signal	fixed	helps monitor motor feedback errors (optimal range = 15...18Vpp)
Motor feedback cosine signal	fixed	helps monitor motor feedback errors (optimal range = 15...18Vpp)
Current actual value	10V = Unit type current	
Bleeder load	10V = 100% Bleeder load	Continuous bleeder load

Figure 9-36: Analog output: Signal selection

Note: Velocity and position data always refer to the motor shaft! The scaleable output signals can reach overload if the scale is selected such that the current signal value exceeds the +/-10V limit. The exceeded value is emulated in the displayable (+/-10V) range and makes it possible to examine signals with a higher resolution.

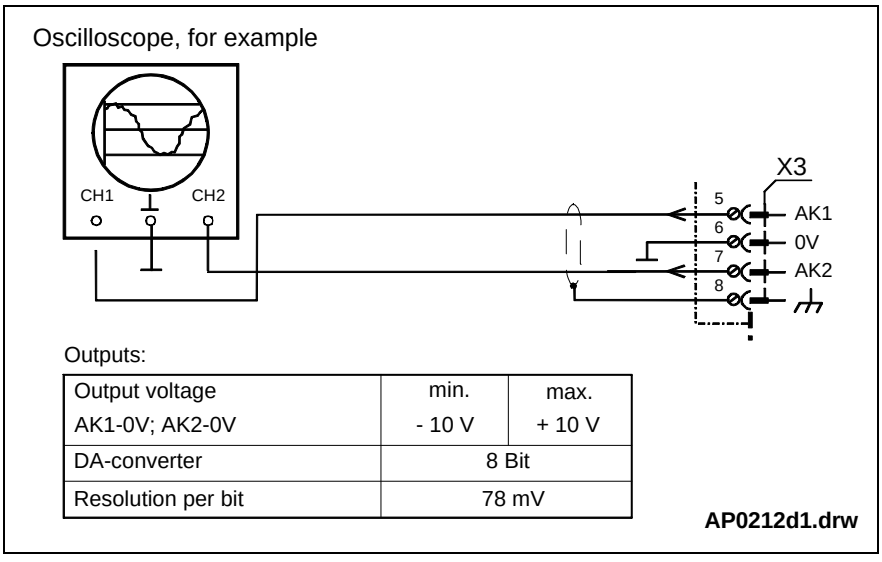


Figure 9-37: Illustration of the diagnostic output connection

9.12 Motor Brake

Servo axes must be secured against unwanted movement when the power is off if movement could cause damage.

INDRAMAT motors are available with optional integrated brakes. **ECODRIVE** DKC drive controllers have an integrated brake control.

Note: INDRAMAT motors have optional holding brakes, which are not designed to be operating brakes. Under closed use brakes become worn out after approx. 20000 motor revolutions. It is therefore important to pay attention to the proper function of a brake when installing a control drive with an integrated brake. Proper operation of the brake can be checked by a "clack-noise" when activating the control enable.

Connecting the Motor Brake

A regulated dc voltage is necessary for the brake's power supply. (24V / +-10%)

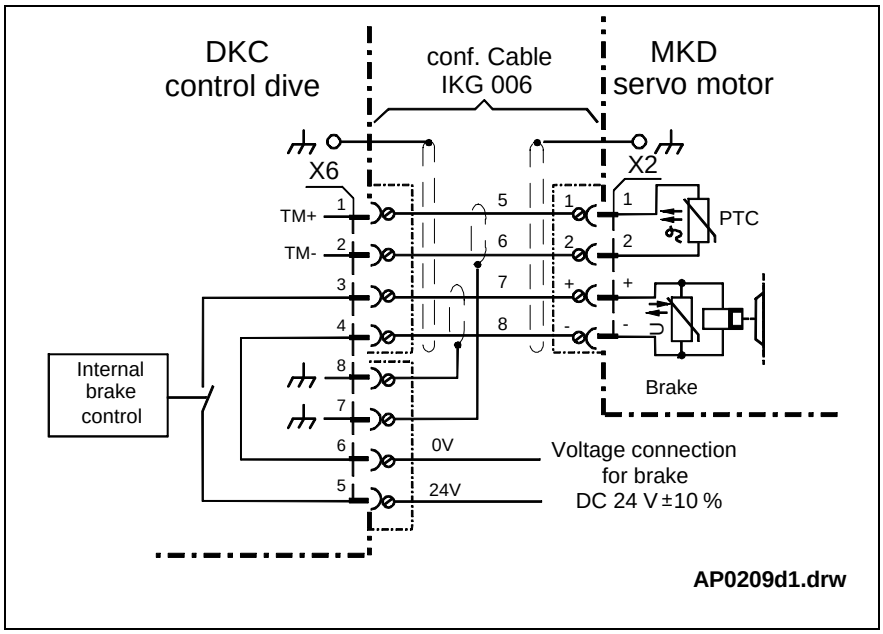
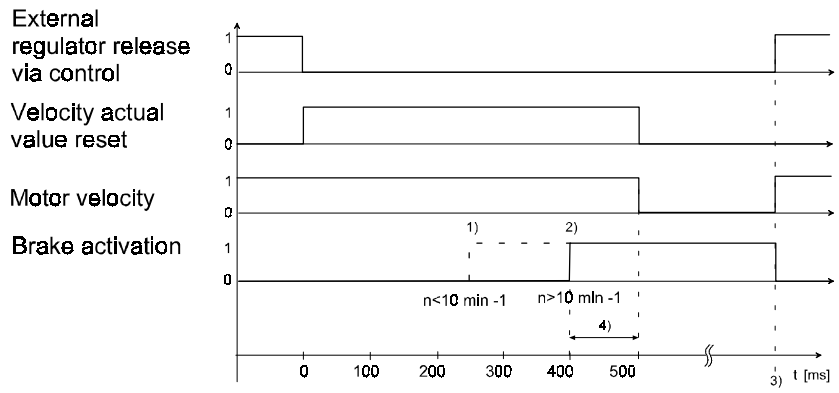


Figure 9-38: Connecting the motor brake

Brake Reaction After Switching Off the Control Enable and in Error Conditions

The brake is controlled via the drive controller. The diagrams below show the chronological reaction of the brake control after the control enable is turned off and in error conditions.



1) The brake falls below a velocity of 10min -1 and is activated.

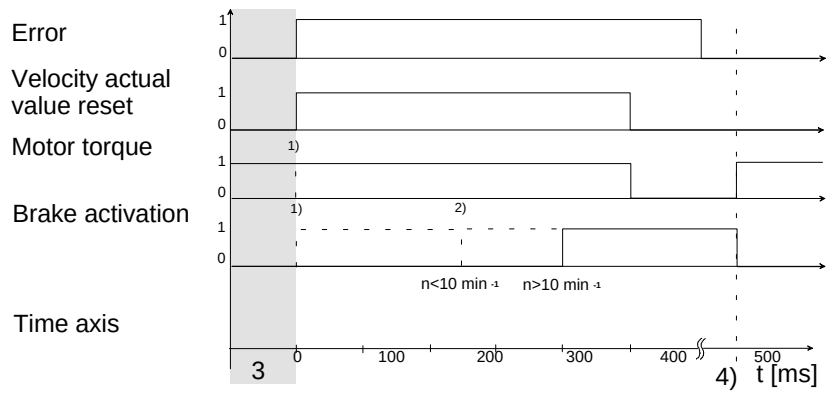
2) The brake is activated after 400 ms, even if the motor velocity > 10 min -1.

3) The brake is released at the same time the regulator release is set.

4) **Warning:** 100 ms after the brake has been activated the motor will become torque free.

SV0027d1.drw

Figure 9-39: Brake: Reaction after removal of the control enable



1) The brake is activated when error reaction 1 is set.

2) Error reaction:
The brake falls below a velocity of 10min^{-1} and is activated.
The brake is activated after 400 ms, even if the motor velocity > 10min^{-1}.

3) Error reaction 3 is set, the brake is activated as in section 2 after the 30 second error warning is completed.

4) After the cause of the error is eliminated, the brake will release when the regulator is released.

sv0026d1.ds4

Figure 9-40: Brake: Reaction in error conditions

9.13 Activating the Drive

Controller Enable

The drive is activated via the controller enable signal.

Requirements for Activating the Drive

The drive must be ready for operation and the power supply must be turned on for the drive to be activated. (Condition display: "Ab")

If the controller enable is set while missing the power supply, the control drive will register F226 Under voltage error.

Drive Stop / Start

Drive Stop / Start in Velocity and/or Torque Control With Analog Command Value

If the drive stop signal is active (0V on X4/3) the drive will not follow the analog command value and will instead remain in velocity control with velocity command value = 0. If the drive is in motion when the drive stop is activated, the controlled braking will be applied with maximum torque until the drive reaches standstill.

If the drive stop signal is not active (24V on X4/3) then the drive will follow the analog command value on X3/1...2.

Starting in Position Control With Step Motor Interface

If the drive stop signal is active (0V on X4/3) the drive will not follow the stepping signal and will instead stay in position control at the current position. If the drive is in motion when the drive stop is activated, then drive controlled braking will be applied with maximum torque until the control drive reaches standstill.

When the drive stop command has been given the drive can still be moved via the jogging inputs. (X2/17...18).

If the drive stop signal is not active (24V on X4/3) then the drive will follow the stepping signals on X2/1...4.

Drive Stop / Start During Positioning Operation

If the drive stop signal is active (0V on X4/3) then the drive will remain in position control at the current position. If the control drive is in motion when the drive stop is activated, then drive controlled braking will be applied with maximum torque until the drive reaches standstill.

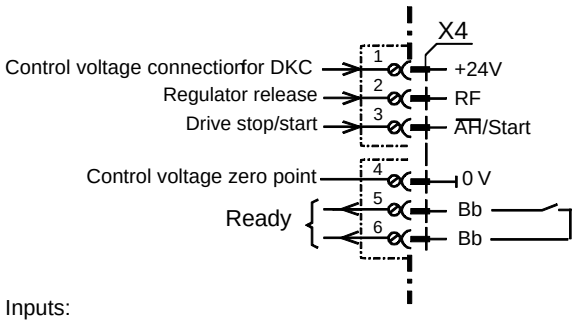
When the drive stop command has been given the drive can still be moved via the jogging-inputs. (X2/17...18).

When the start signal is activated the previously selected positioning set is started.

Drive Stop / Start During a Drive Controlled Homing Procedure

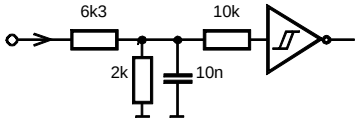
If the drive controlled homing procedure signal is activated (24V on X2/13) and the start signal is activated afterwards (24V on X4/3) then the drive will execute its internal homing procedure.

Control Enable and Drive Stop Connections



Inputs:

Input voltage	min.	max.
HIGH	16 V	30 V
LOW	-0.5 V	8 V
Input resistance	approx. 8 kOhm	



AP0211d1.drw

Figure 9-41: RF and AH / Start connections

10 Serial Communication

10.1 General Information for Serial Communication

The DKC01.1/DKC11.1 contains one serial interface . Parameter and diagnostic information can be exchanged through this interface. The interface can be operated alternatively in either **RS232 mode** or in **RS485 mode**.

10.2 Communication over the RS232Interface

The RS232 interface is intended for connection port to a PC with the DRIVETOP startup program . A maximun cable length of 15m is possible.

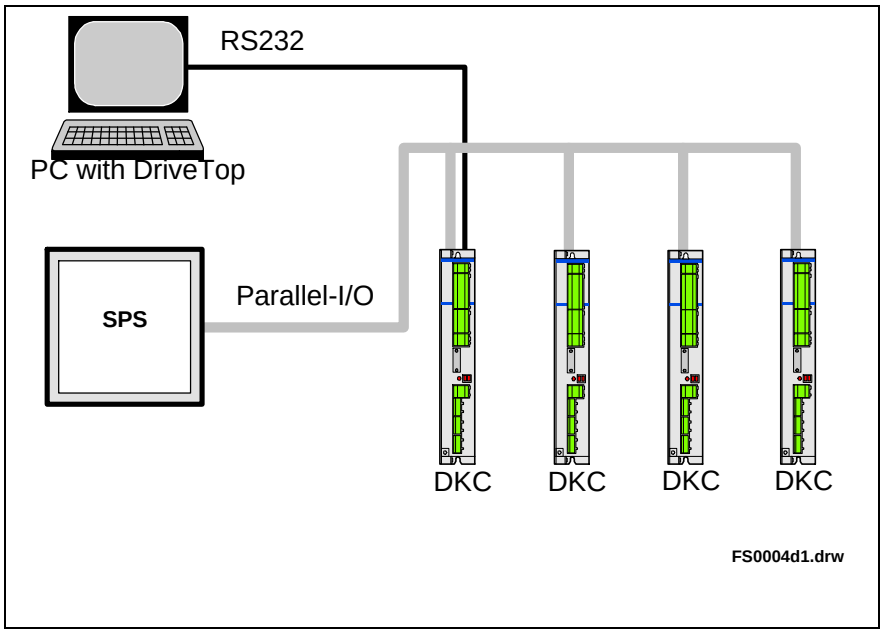


Figure 10-1: Communication over the RS232 Interface

10.3 Communication over the RS485 Interface

Communication over the RS485 interface allows the realization of a serial bus with the following specifications :

- Up to 32 drives can be connected with a bus master.
- Transmission rate: 9600 and 19200 baud
- Maximum cable length : 1000m
- Half duplex operation over 2 wire transmission line

Type of Data Exchange over RS485:

- Parameters
- Commands
- Diagnostics

Operation of Multiple Drives with DRIVETOP

Operational Advantages:

- Startup of multiple DKCs without reconnection of the interface cable.(Central parameterization and diagnostic connection)
- Realization of a central PC supported visualization unit

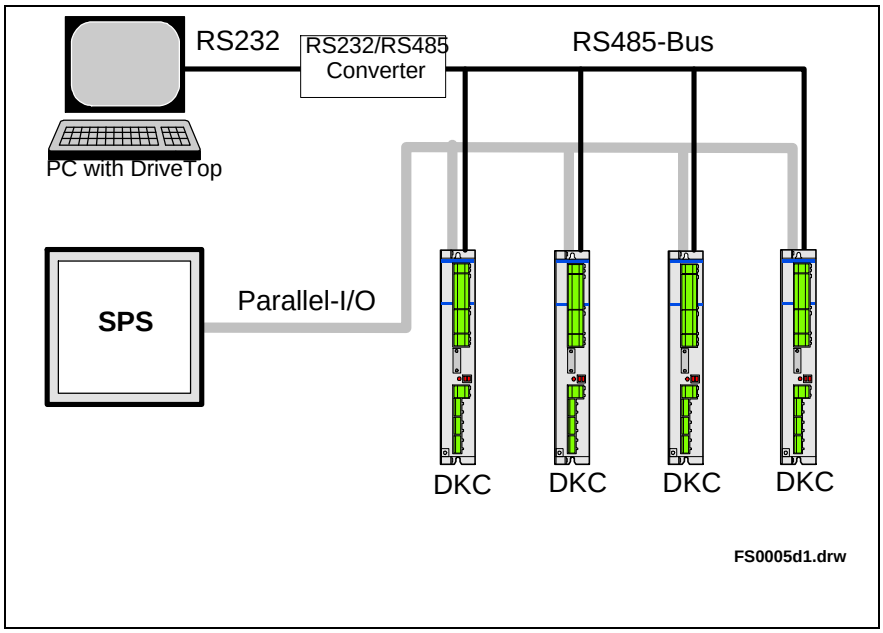


Figure 10-2: Operation of Multiple Drive with DRIVETOP

Parameterization and Diagnostics via a SPS (PLC)

Operational Advantages:

- Changing of parameters is possible via a PLC . (for example the adaptation of the positioning commands)
- Expanded diagnostic possibilities for the PLC through processing of the error codes.

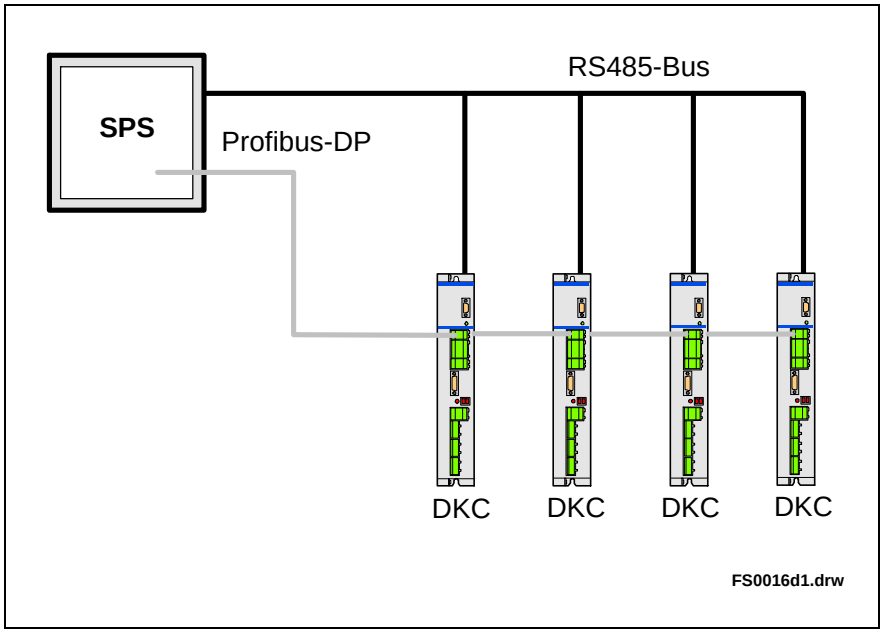


Figure 10-3: Parameterization and Diagnostics over a SPS

Parameterization and Diagnostics for Drive Group through the Operator Interface

Operational Advantages:

- Implementation of a central visual display unit

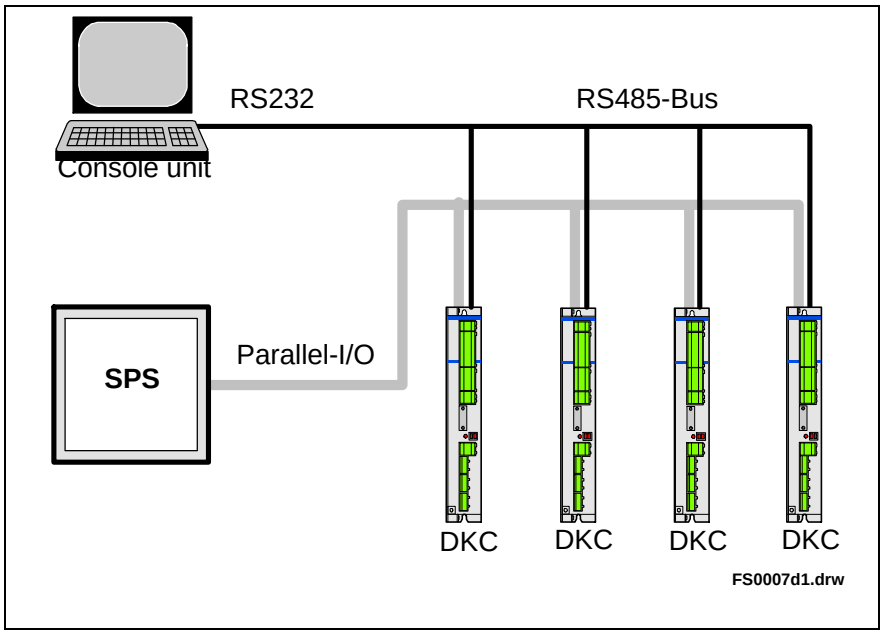


Figure 10-4: Parameterization and diagnosis of the drive group through a control unit

10.4 Communication Procedures

Communication Parameters

The data exchange over the serial interface is controlled with three parameters:

- Drive Address (**P-0-4022**)
- Baud rate (**P-0-4021**)
- Answer Delay (**P-0-4050**)

P-0-4022 Drive Address

If multiple drives are connected over the RS485 interface, then the data exchange must be organized through the allocation of drive addresses to the individual units on thebus .

The parameter P-0-4022 establishes the address where a drive can be contacted. There are admissible addresses from 1 to 99.

With the use of the RS232 interface, an explicit setting of the drive address is not required because in this case only one drive at a time can be connected to the interface.

If multiple drives are connected via RS485,

⇒ the drive address must be established over the RS232 interface before making the RS485 connection. This is done in order to ensure that only one drive functions for each given address on the serial bus.

P-0-4021 Baud Rate

The baud rate of the serial interface is set by parameter . The following settings are possible:

0 : 9600 Baud

1 : 19200 Baud

⇒ All the devies on the bus must be set to the same baud rate

P-0-4050 Answer Delay

The RS485 interface operates in half duplex mode. The direction of the data must be switched during the data exchange. The switch of the data direction happens in less than half of one millisecond for the DKC units. In order for the connected terminal devices (PC or SPS) to be given enough time for the data direction switch to occur, the answer delay/PLC time of the drive can be set in this parameter.

The entry is in ms. The maximum setting is 200ms.

The default value for the answer delay is set at 1ms at the manufacturer . From past experience most PC's will operate without any problems with this setting.

If communication problems occur , for example a "TIMEOUT" message in DriveTop, then the value for the answering delay can gradually be set

to a larger value until there are no more problems occurring . For a safe margin , the limit value so determined should be multiplied with 1.5 and then entered as the answering delay value.

Setting of the Drive Address

In the case where the communication occurs over the RS485 bus, then each of the bus communication devices must be provided with a unique bus address. In order to avoid access conflicts, each drive address must be used only once.

Note: With the DKC 01.1, the setting of the drive address occurs over the RS232 interface with help from DriveTop. The communication parameter "P-0-4022 Drive Address" establishes the active address of each of the units on the bus. With DKC 02.1 and DKC 03.1, the RS485 address of the drive is the same as the SERCOS or PROFIBUS address. With these units , the address will be set with the address selection switch on the device.

Original State after Establishing the Control Voltage

After turning on the control voltage, all drives conntected over the RS485 bus of the are in the "passive mode".

With the passive mode, there is no possibility of communication. In order to reach the active mode, a drive must be targeted and contacted through a "change drive" command.

Communication with a Specific Unit on the Bus

In order to establish communication with a unit on the bus, a CHANGE DRIVE command must be issued with the target to the specific drive address on the bus . With each CD command, the contacted drive will be activated and all other drives will be switched into the passive mode. The contacted drive reports with its prompt. From this point the communication continues with the activated drive until communication is switched to another drive through a subsequent CHANGE DRIVE command.

Example:

BCD:04 (CR)	Command for switching communication to Drive 4
A04:>	Response of the contacted drive. All other drives switched .

Parameter Structure

All parameters of the drive controller are stored in a stamdard parameter structure. Each parameter consists of 7 elements. The table below defines the individual elements and the access possibilities. The following sections will reference the each diagrammed parameter structure.

Element-No.Nr.	Data Block Element	Access Possibilities
1	ID number	Read
2	Name	Read
3	Attribute	Read
4	Unit	Read
5	Min. input value	Read
6	Max. input value	Read
7	Operational datum	Read / Write

Figure 10-5: Parameter Structure

Note: In the Appendix A there is a parameter description with detailed specifications of the qualities of all the operational parameters.

Writing To a Parameter

Writing to a parameter is allowed generally in the following manner:

A01:> ***ID number of the parameter, data block element number, w, operational datum (Carriage Return)***

After a completed writing operation, the unit responds again with its prompt.

For example, in order to write to the datum value of the parameter P-0-0004, the following input is required:

A01:>***P-0-0004,7,w,500 (Carriage Return)***

A01:> The drive writes the value 500 to the operating data (data block element 7).

Reading of a Parameter

The general form for reading a parameter is as follows:

A01:> ***ID number of the parameter, data block element number, r (carriage return)***

The drive responds with the contents of the contacted data block element again.

For example, in order to access the operating data of the parameter P-0-004, the following input is required:

A01:>***P-0-0004,7,r (Carriage Return)***

1000

The drive returns the value 1000 as the operating data (data block element 7).

Writing to a List Type Parameter

There is a series of list type parameters in the drive. These lists are written to in a modified manner.

A01:> ***ID number of the parameter, data block element number, w> (carriage return)***

?List element 1 (carriage return)

?List element 2 (carriage return)

...

?List element x (carriage return)

?< (Carriage Return

It is important that the input is terminated with the < symbol, only then will the data be wrtten to the drive.

Note: When wrting to list-type parameter, all the list elements and the element order must be maintained. If a list element is removed or not included, then the location of subsequent list elements values will be displaced by element number.

Reading a List Type Parameter

Reading a list parameter is done in the same manner as with a normal parameter. The drive responds, however, with an answer of all the list elements.

Executing Parameter Commands

With the DKC, a series of commands can be processed. The execution of commands happens automatically within the controller. There are commands for the following:

- **Switching between operational and parameterization modes**
  S-0-0127 Switching from initializing phase 2 to 3
  S-0-0128 Switching from initializing phase 3 to 4
  P-0-4023 Switching from initializing phase 4 to 2
- **Basic Load** (S-0-0262)
- **Clear Error** (S-0-0099)
- **Homing Procedure** (S-0-0148)
- **Setting Absolute Measurement** (P-0-0012)
- **Setting Absolute Measurement Emulation** (P-0-4032)

A command can be started, interrupted or ended over the serial interface. Over thisinterface the status of the command status can be set.

The general form for executing a command is as follows:

A01:> ***ID number of the parameter, 7, w, 11 (carriage return)***

Requesting the Statusof Commands

The actual status of a command can be requested. Using the request for the command status is especially important when it is necessary to establish that the driving side of the command process is completed before the connected control (or the PC) ends a command.

The general form for requesting the status of a parameter command is as follows:A01:> ***ID number of the parameter, 1, w, 0 (carriage return)***

The drive responds to the request to write to the ID number of the command parameter by returning the actual command status.

11 For example: (meaning the command in the drive is set and enabled)

Possible status messages:

- Command is set in the drive
- Command execution terminated in the drive
- Command is not yet completed
- Command execution is not possible(error)
- Command was successfully completed
- Command operation interrupted in the drive
- Command is not set in the drive.

The command status will be transmitted in the form of a bit list. The meaning of each bit is displayed below.

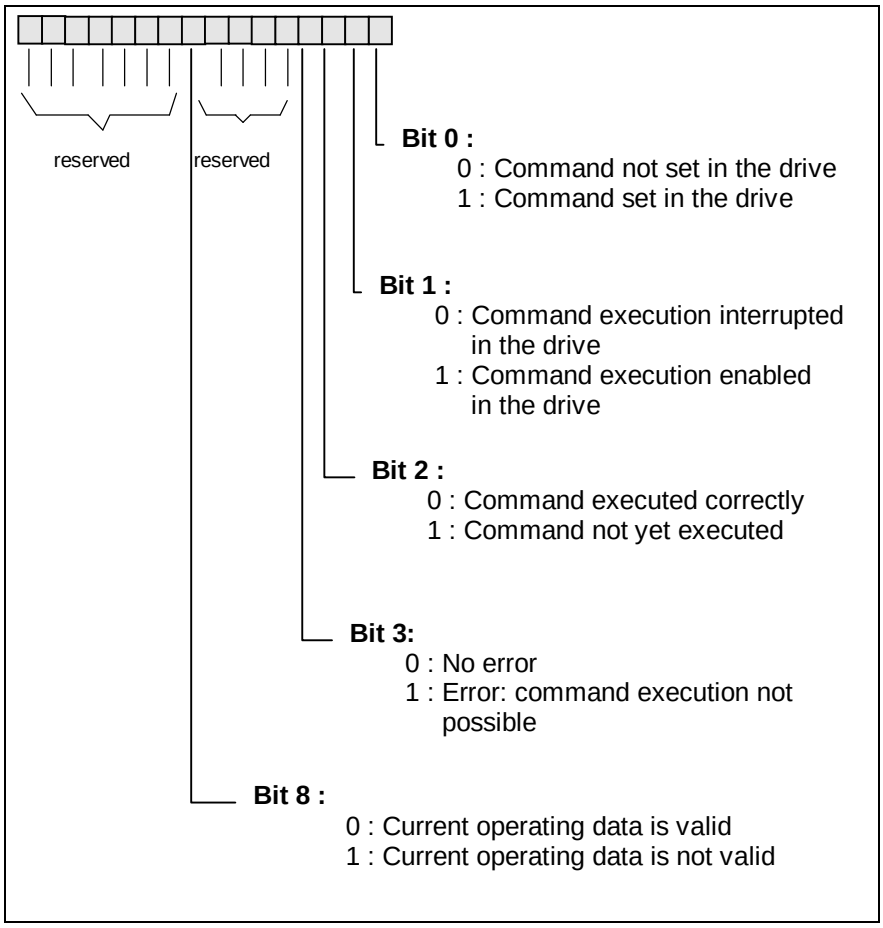

reserved
reserved
Bit 0 :
0 : Command not set in the drive
1 : Command set in the drive
Bit 1 :
0 : Command execution interrupted in the drive
1 : Command execution enabled in the drive
Bit 2 :
0 : Command executed correctly
1 : Command not yet executed
Bit 3:
0 : No error
1 : Error: command execution not possible
Bit 8 :
0 : Current operating data is valid
1 : Current operating data is not valid

Figure 10-6: Command reception (data status)

Ending a Parameter Command

The general form for ending a parameter command is as follows:

A01:> ***ID number of the parameter, 7, w, 0 (carriage return)***

Error Message

If illegal parameter access is attempted or for example writing access to a read only data block element is attempted an error message is issued by the drive.

List of the possible error codes

Error code:	Error description:
#1001	ID number missing
#1009	Invalid access to element 1
#2001	Namemissing
#2002	Transmitted name is too short
#2003	Transmitted name is too long
#2004	Name cannot be written to
#2005	Name is currently not editable
#3002	Transmitted attribute is too short
#3003	Transmitted attribute is too long
#3004	Attribute is not changeable
#3005	Attribute is currently write protected
#4001	Unit missing
#4002	Transmitted unit is too short
#4003	Transmitted unit is too long
#4004	Unit is not changeable
#4005	Unit is currently not changeable
#5001	Min. value missing
#5002	Transmitted min. value is too short
#5003	Transmitted min. value is too long
#5004	Min. value is not changeable
#5005	Min. value is currently not changeable
#6001	Max. value missing
#6002	Transmitted max. value is too short
#6003	Transmitted max. value is too long
#6004	Max. value is not changeable
#6005	Max. value is currently write protected
#7002	Transmitted datum is too short
#7003	Transmitted datum is too long
#7004	Datum cannot be written to
#7005	Datum cannot currently be written to
#7006	Datum < min. value
#7007	Datum > max. value
#7008	Datum is not correct
#9001	Input is not identifiable
#9002	Parameter type error
#9003	Invalid data set number
#9004	Invalid data block number
#9005	Data element number is not defined
#9006	Error in read-write recognition (r/w)
#9007	Invalid character in the data

10.5 Operation Example

Changing of the Positioning Command Data

Assumption:

- Multiple drives are connected over a RS485 interface to a SPS/PLC. The currently entacted has the address 1.
- The drive functions in positioning made It will use 4 positioning blocks.
- The target positions of the positioning block data should be changed over the RS485 interface.

Initiating communication to the desired axis

BCD:01 (CR) Command for Switching to Drive **A01:>**
Response of the contacted drive.
All other drives function in passive mode.

Note: There is not a signal reflection, instead the drive transmitts the complete input sequence back after reception of the CR.

The resident memory mode is deactived

Normally the parameter will be stored through writing in a EEPROM so that the data remains after the supply voltage is turned off.

If the application would require to proceed with frequent changes of the parameters during operation, for example the changing of the target position of positioning data sets, there is a danger of eventually exceeding the maximum allowable number of writing cycles of the EEPROM. In order to avoid this possibility , the resident memory must be turned off.

Turning off of the resident memory mode must be done after each time the power supply of the connected controller is turned on and is valid until the next time the power supply is turned off. While non-resident mode is active, all parameter data is written to Ram memory only.

Turning off the resident memory: **A01:>** S-0-0269,7,w,1 (CR)

Writing the List of the Target Positions in the Drive

The target positions of all the axes are stored in the form of a list in the parameter P-0-4006. In order to change one or more of these values, all of the relevant values of this list must be written. If four target positions will be used, then all 4 positions must be written even if only one of the positions should be changed.

A01:> P-0-4006, 7,w,> (CR)

?*100.0 (CR)* Target position command 0
?*200.0 (CR)* Target position command 1
?*300.0 (CR)* Target position command 2
?*400.0 (CR)* Target position command 3
?*<(CR)* (CR)

Immediately after writing to the target positions, the new values in the drive are active.

10.6 Connection Technique

RS485 Connection

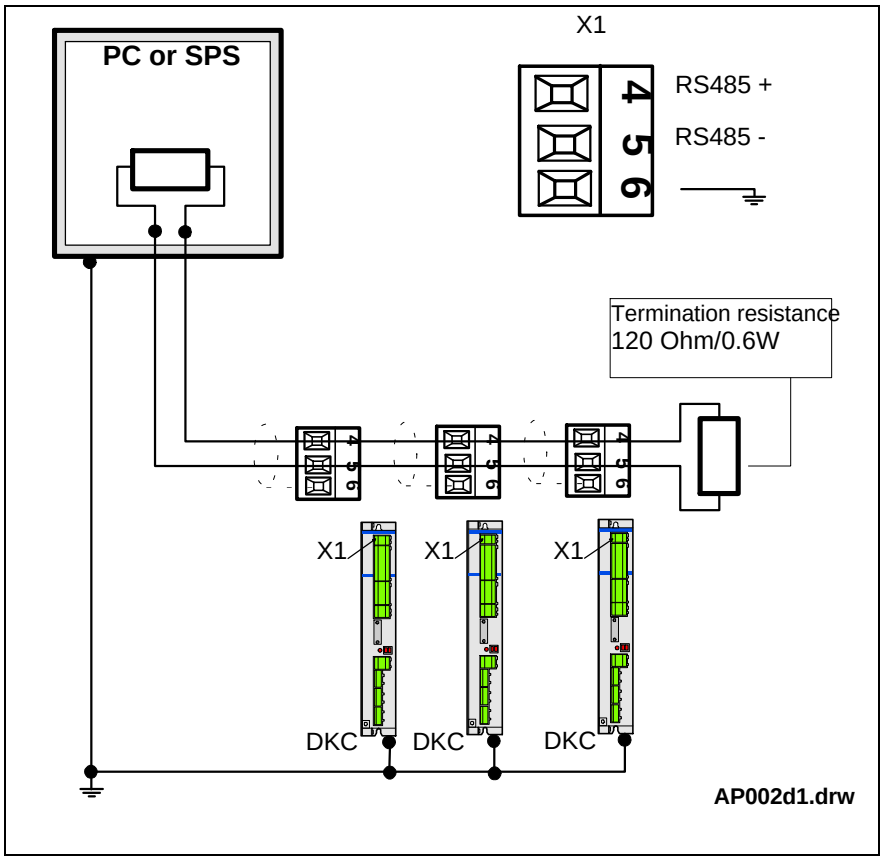


Figure 10-7: RS485 Connection

In the graphic above change “SPS” label to “PLC” and “resistance” to “resistor”

Note: There can be a maximum of 32 drives which are connected! The maximum total cable length is 1000m! A terminating connector is supplied with each unit. The termination resistors must be installed at the end of the transmission line using wire ferrules..

RS 232 Connection

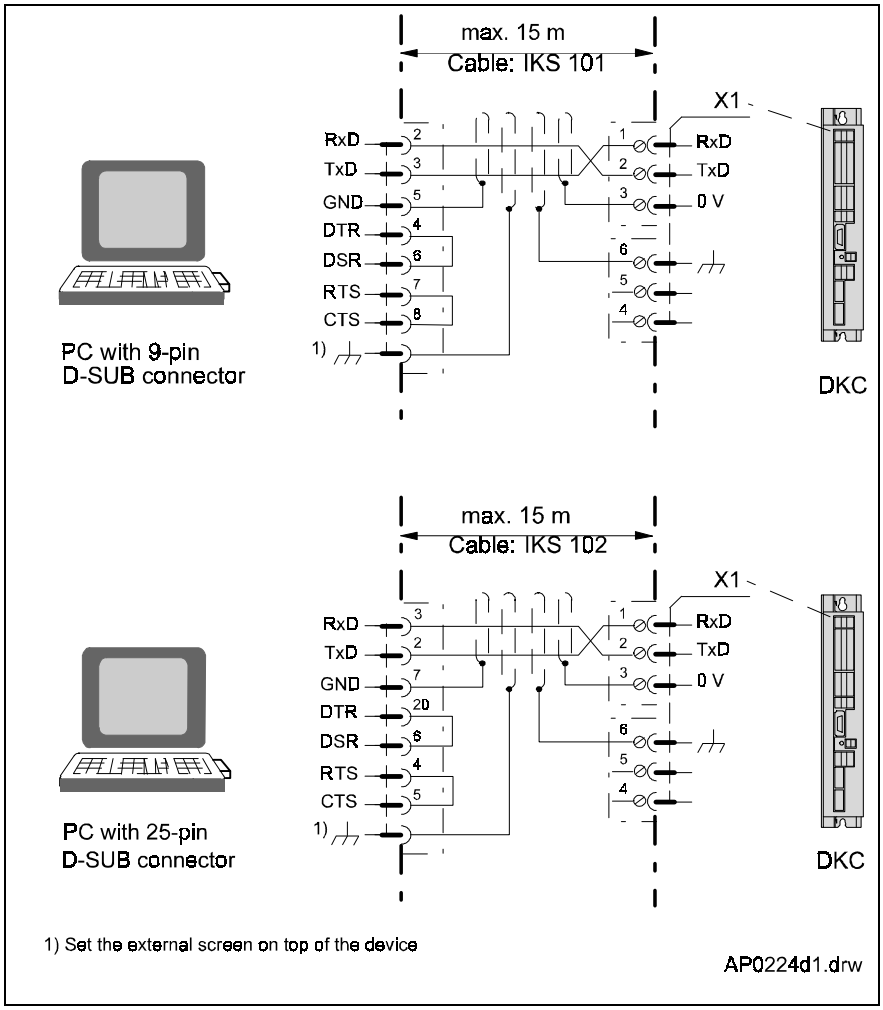


Figure 10-8: RS 232 Connection

Note: Only point to point connection with maximum cable length of 15mis possible, the PC and drive controller unit must share a common central ground.

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ECODRIVE
DCK01.1/DKC11.1
Drive Control Devices

Supplement A
Parameter description
ASE 02VRS

DOK-ECODRV-ASE-02VRS**-FKB1-EN-P • 07.96

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4 Index **4-1**

1 General Information

Structure of this Document

All standard and product-specific parameters are listed in this chapter in ascending numerical order.

It suppliments to the entries made in the Functional Description and represents a complete description of all parameters used in the ECODRIVE product.

Note: The parameter description is especially significant when you are using the serial interface (RS485/232) from the drive controllerunit.
You do not require detailed knowledge of the significance of each parameter if you are using the DriveTop to set parameters during installation.

The description of the individual parameters is divided into two subsections.

1) General description

The function of the parameter is given in this section.

2) Attributes

Description of the significance of the parameter and help for setting and editing parameter values are in the attributes section.

This includes the list of charcteristics and characteristic values used to classify the parameters. They are necessary for the complete description of the parameter.

However, if you would like a quick overview of the significance of the parameter, they are not relevant.

Definitions

The following abbreviations are used:

Data length:

2Byte - the data length for the operating data is 2 Bytes

4Byte - the data length for the operating data is 4 Bytes

1Byte variable - this is operating data of variable length (list), the length of a single data element is 1 Byte

2Byte variable - this is operating data of variable length (list), the length of a single data element is 2 Bytes

4Byte variable - this is operating data of variable length (list), the length of a single data element is 4 Bytes

Format :

BIN - the display format for the operating data should be binary.

Note: Leading zeros of BIN Format data are not transmitted via ASCII strings over the RS232/485 serial interface nor displayed in DriveTop. For example, the datum value 0000, 0000, 0011, 1011 would be transmitted and displayed as 11,1011.

HEX - the display format for the operating data should be hexadecimal

DEC_OV - the display format for the operating data should be decimal without a sign

DEC_MV - the display format for the operating data should be decimal with a sign

ASCII - the operating data is an ASCII string

IDN - the operating data is an ID number

Edit:

no - the operating data can not be edited

P2 - the operating data can only be edited in communication phase 2

P23 - the operating data can only be edited in communication phase 2 and 3

P234 - the operating data can be edited in any communication phase

P3 - the operating data can only be edited in communication phase 3

P4 - the operating data can only be edited in communication phase 4

Memory :

fixed - the operating data is programmed in the drive

no - the operating data is not buffered in the drive, the value after turning on the drive controller is not defined.

Param.E²prom - the operating data is buffered in the parameter E²prom (IC2 on the drive controller main circuit board).

Ampl.E²prom - the operating data is buffered in the E²prom from the drive controller.

Feedb.E²prom - the operating data is buffered in the E²prom from the motor feedback data memory. (only for MDD- and MKD motors)

The following paramter operating data are stored in the motor feedback:

- P-0-0018
- P-0-0508
- P-0-0509
- P-0-0510
- P-0-0511
- P-0-0512
- P-0-0513
- P-0-4014
- P-0-4005
- P-0-4037
- P-0-4038
- P-0-4039
- P-0-4042
- P-0-4047
- P-0-4048
- S-0-0109
- S-0-0111
- S-0-0113
- S-0-0116

Validity check:

no - the operating data will not be checked for validity

Phase2 - the operating data will be checked in the command "Communication phase 3 transition check"

Phase3 - the operating data will be checked in the command "Communication phase 4 transition check"

Extreme value check:

no - the operating data will not be checked for extreme values when it is written to

yes - the operating data will be checked for extreme values when it is written to

Combination check:

no - the operating data will not be checked (bitwise)for valid combination with other paramter values when it is written to

yes - the operating data will be checked (bitwise) for valid combination with other parameter values when it is written to

cyc. transmittable :

only in SERCOS devices

Default Value:

The default value indicates the value of the parameter loadedinto fixed memory with the current version of firmware installed on the drive following the PL program load command and prior to user edits or loading saved parameter files.

2 Standard parameters

S-0-0014, Interface Status

Description:

The current communication phase can be requested through the first three bits (0, 1, 2).

2 The drive is in the parameter mode

4 The drive is in the operate mode

Structure of the parameter:

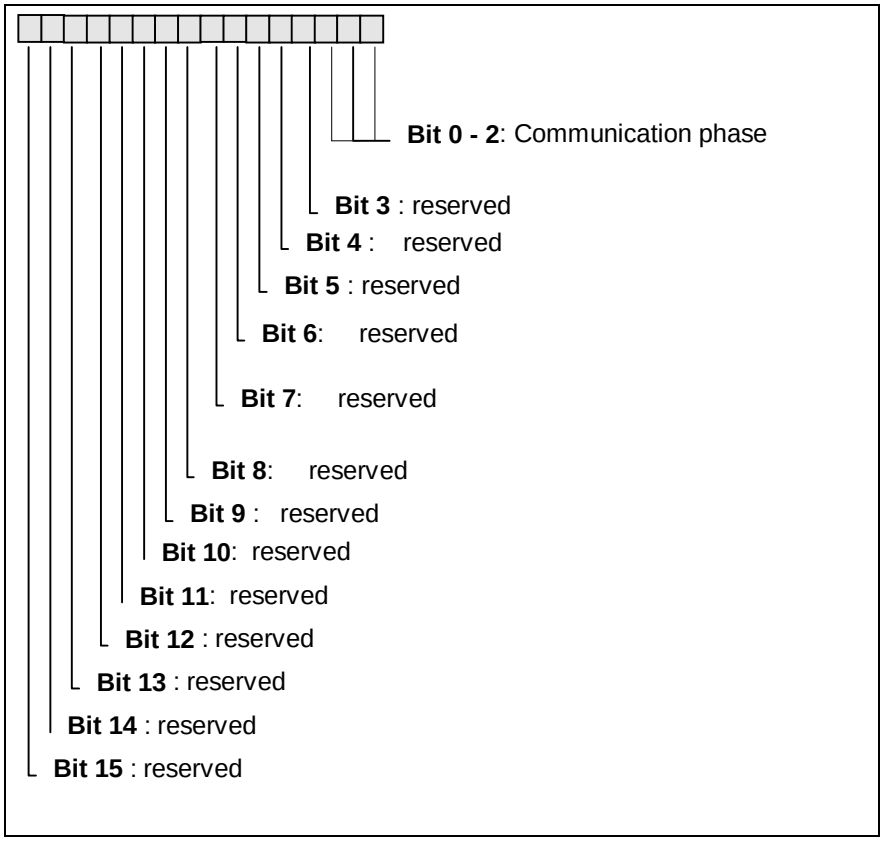


Figure 2-1: S-0-0014, Interface Status

Note: This parameter is not available for DKC01.1/DKC11.1 firmware

S-0-0014 - Attributes

Name in German:	Schnittstellen-Status		
Name in English:	Interface Status		
ID number:	S-0-0014	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0017, IDN List of all operational Data

Desrciption:

The identification numbers of all drive data are included in this list. The parameters included in this IDN list are displayed by IDN number, name, and value in DriveTop through the menu selection Parameter | List of all Parameters.

S-0-0017 - Attributes

Name in German:	IDN-Liste Betriebsdaten		
Name in English:	IDN List of All Operation Data		
ID number:	S-0-0017	**Editability:**	no
Function:	Parameter	**Memory:**	fixed
Data length:	2Byte variable	**validity check:**	no
Format:	IDN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0021, IDN List of Invalid Op. Data for Comm. Ph.2

Description:

Before the drive executes the delayed phase switch from 2 to 3 that was initiated with the command **Communication phase 3 transition check, S-0-0127"**, it will check to see if all communication parameters are complete and correct. If the drive identifies one or more IDN's that are invalid, it will write the operating data that is still needed or is invalid in this ID No. list. This will be displayed to the drive through the command error diagnostic message **C101, Communication parameters incomplete**.

S-0-0021 - Attributes

Name in German:	IDN-Liste ungültige Betriebsdaten Phase 2		
Name in English:	IDN List of Invalid Op. Data for Comm. Ph.2		
ID number:	S-0-0021	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2Byte variable	**validity check:**	no
Format:	IDN	**Extreme value check:**	no

Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0022, IDN List of Invalid Op. Data for Comm. Ph.3

Description:

Before the drive executes the phase delayed switch from 3 to 4 that was initiated with the command **Communication phase 4 transition check, S-0-0128"**, it will check the parameters for following items:

- Validity of the parameter
- Parameter value is found within the possible input range between the min. and max. input value attributes.
- "Compatibility" with other parameters

If a parameter checks proves negative, this operating data will be written in this ID No. list.

The drive then responds to the transition command with the communication error diagnostic message:

- C201 Parameter record incomplete or
- C202 Parameter limit value error or
- C203 Parameter conversion error

This IDN list of invalid parameters may be displayed and edited through the DriveTop menu selection Parameter/List of all invalid parameters.

S-0-0022 - Attributes

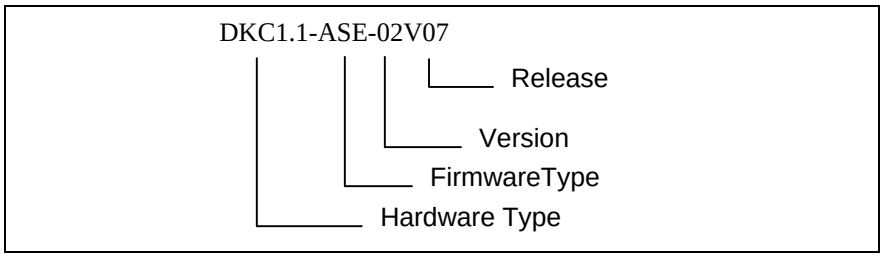
Name in German:	IDN-Liste ungültige Betriebsdaten Phase3		
Name in English:	IDN List of Invalid Op. Data for Comm. Ph.3		
ID number:	S-0-0022	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2Byte variable	**validity check:**	no
Format:	IDN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0030, Manufacturer Version

Description:

The drive firmware version can be read as text from this parameter.

Example:



S-0-0030 - Attributes

Name in German:	Hersteller-Version		
Name in English:	Manufacturer Version		
ID number:	S-0-0030	**Editability:**	no
Function:	Parameter	**Memory:**	fixed
Data length:	1Byte variable	**validity check:**	no
Format:	ASCII	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0032, Primary Mode of Operation

Description:

The mode of operation defined in this parameter will be activated in the drive when:

- the control and power sections are ready for operation
- the controller enable RF is set
- and the AH/Start signal has been given

The selection of the operating mode is made by entering a bit list.

Bit list:	Meaning:
0000,0000,0000,0001	Torque regulation
0000,0000,0000,0010	Velocity regulation
0000,0000,0011,0011	Position regulation, positioning interface, with following error
0000,0000,0011,1011	Position regulation, positioning interface, without following error
1100,0000,0000,1011	Position regulation, step motor interface without following error, rotational feedback
1100,0000,0000,0011	Position regulation, step motor interface with following error, rotational feedback

Figure 2-2: Mode of Operation

S-0-0032 - Attributes

Name in German:	Hauptbetriebsart		
Name in English:	Primary Mode of Operation		
ID number:	S-0-0032	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	10b

S-0-0033 Secondary Operation Mode 1

Description:

The first secondary operation mode is reserved for the jogging operation for DKC.

The secondary operation mode is a fixed setting and cannot be changed.

S-0-0033 - Attributes

Name in German:	Nebenbetriebsart-1		
Name in English:	Secondary Operation Mode 1		
ID number:	S-0-0033	**Editability:**	no
Function:	Parameter	**Memory:**	Param. E²Prom
Data length:	2 byte	**validity check:**	yes
Format:	binary	**Extreme value check:**	no
Unit German/English:	-/-	**combination check:**	yes
Posit. after the dec.:	-	**cyc. transmittable:**	no
Input value min / max:	-/-	**Default value:** 1100000000011011 b	

S-0-0036, Velocity Command Value

Description:

This parameter is used to set the velocity command value. This together with **S-0037 Additive, Velocity Command Value** determine the effective Velocity Command Value for the drive.

In the position control operating modes, this parameter displays the output error signal of the position controller.

S-0-0036 - Attributes

Name in German:	Geschwindigkeits-Sollwert		
Name in English:	Velocity Command Value		
ID number:	S-0-0036	**Editability:**	P234
Function:	Parameter	**Memory:**	no
Data length:	4Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	yes

Unit German/English:	S-0-0044/S-0-0044	**combination check:**	no
Posit. after the dec.:	S-0-0044	**cyc. transmittable:**	MDT
Input value min / max:	S-0-0044/S-0-0044	**Default value:**	--

S-0-0037, Additive Velocity Command Value

Description:

The additive velocity command value is added to the **S-0-0036, Velocity command value** in the drive.

S-0-0037 - Attributes

Name in German:	Geschwindigkeits-Sollwert additiv		
Name in English:	Additive velocity command value		
ID number:	S-0-0037	**Editability:**	P234
Function:	Parameter	**Memory:**	no
Data length:	4Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0044/S-0-0044	**combination check:**	no
Posit. after the dec.:	S-0-0044	**cyc. transmittable:**	AT
Input value min / max:	S-0-0044/S-0-0044	**Default value:**	--

S-0-0040, Velocity Feedback Value

Description:

The velocity feedback value is updated by the drive controller every 500ms. (This can be transferred via the serial communication interface.)

S-0-0040 - Attributes

Name in German:	Geschwindigkeits-Istwert		
Name in English:	Velocity Feedback Value		
ID number:	S-0-0040	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	4Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	no
Unit German/English:	S-0-0044/S-0-0044	**combination check:**	no
Posit. after the dec.:	S-0-0044	**cyc. transmittable:**	AT
Input value min / max:	S-0-0044/S-0-0044	**Default value:**	--

S-0-0041, Homing Velocity

Description:

Determines the velocity for the **S-0-0148, Drive controlled homing procedure** command in conjunction with the S-0-0108, Feedrate Override parameter. In the case of a drive motor with an absolute encoder (K-type feedback option), if the S-0-0148, Drive controlled homing procedure is initiated, then the drive will proceed to the reference point (home position) that was determined with the Set absolute measurement, P-0-0012 command with this velocity.

S-0-0041 - Attributes

Name in German:	Referenzfahr-Geschwindigkeit		
Name in English:	Homing velocity		
ID number:	S-0-0041	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0044/S-0-0044	**combination check:**	no
Posit. after the dec.:	S-0-0044	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0044	**Default value:**	+100.0000 Rpm

S-0-0042, Homing Acceleration

Description:

The acceleration value for the ramp up to homing velocity with which the **S-0-0148, Drive controlled homing procedure** command is performed is set in this parameter.

S-0-0042 - Attributes

Name in German:	Referenzfahr-Beschleunigung		
Name in English:	Homing acceleration		
ID number:	S-0-0042	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0160/S-0-0160	**combination check:**	no
Posit. after the dec.:	S-0-0160	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0160	**Default value:**	+1000.000 rad/s2

S-0-0043, Velocity Polarity Parameter

Description:

The polarity of the velocity data that is applied to the application can be switched in this parameter.

The polarity will be switched externally (at the command & feedback input; and actual value output) and not within the control system velocity regulator..

The following applies to rotary motors:

Clockwise rotation when facing the motor shaft is the rule for a positive velocity command value difference and a positive velocity feedback value polarity.

Structure of the parameter:

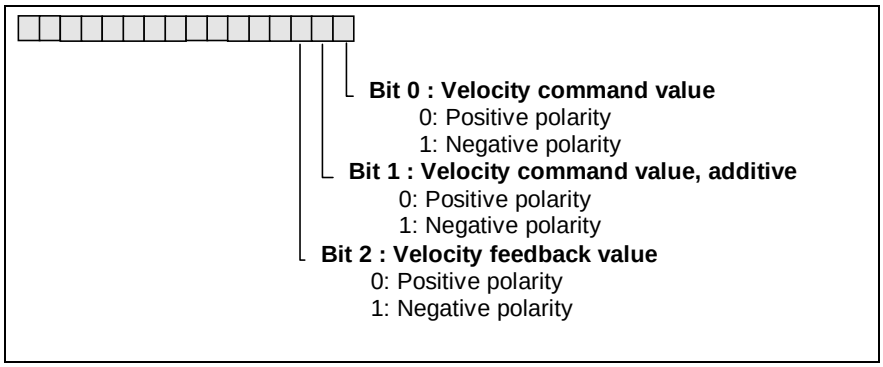

Bit 0 : Velocity command value
0: Positive polarity
1: Negative polarity
Bit 1 : Velocity command value, additive
0: Positive polarity
1: Negative polarity
Bit 2 : Velocity feedback value
0: Positive polarity
1: Negative polarity

Figure 2-3: S-0-0043, Velocity Polarity Parameter

S-0-0043 - Attributes

Name in German:	Geschwindigkeits-Polaritäten-Parameter		
Name in English:	Velocity polarity parameter		
ID number:	S-0-0043	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/--	**Default value:**	0 b

S-0-0044, Velocity Data Scaling Type

Description:

Various scaling types can be defined for the velocity data in the drive.

Examples: RPM -> rotary
mm/min -> linear

Structure of the parameter:

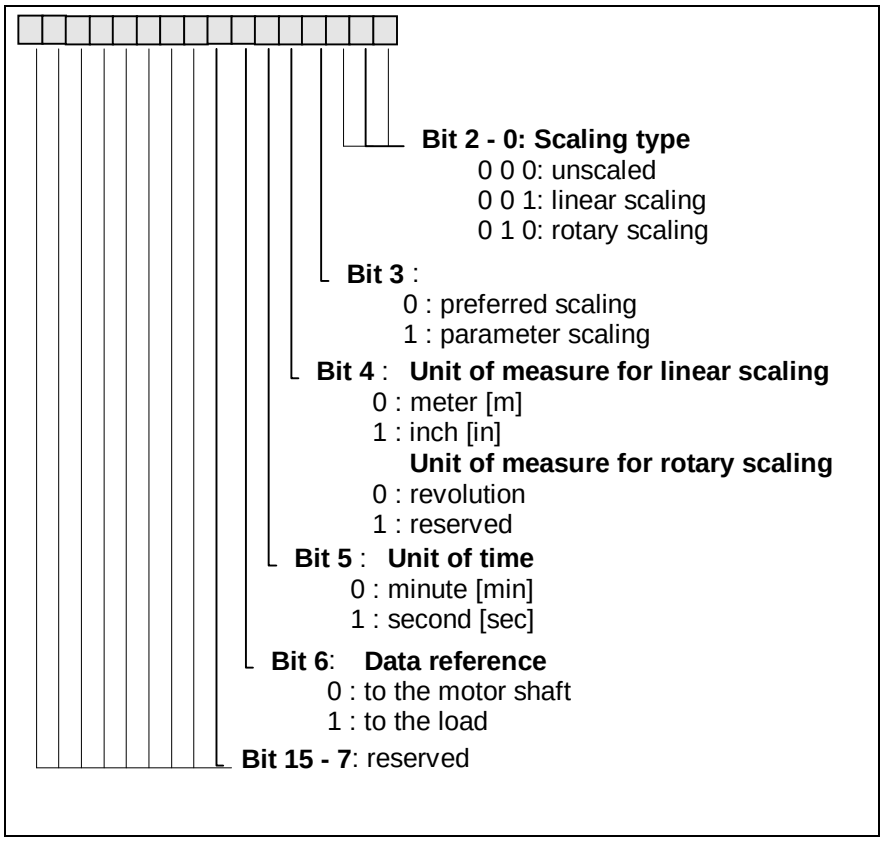

Bit 2 - 0: Scaling type
0 0 0: unscaled
0 0 1: linear scaling
0 1 0: rotary scaling
Bit 3 :
0 : preferred scaling
1 : parameter scaling
Bit 4 : Unit of measure for linear scaling
0 : meter [m]
1 : inch [in]
Unit of measure for rotary scaling
0 : revolution
1 : reserved
Bit 5 : Unit of time
0 : minute [min]
1 : second [sec]
Bit 6: Data reference
0 : to the motor shaft
1 : to the load
Bit 15 - 7: reserved

Figure 2-4: S-0-0044, Velocity Data Scaling Type

Notes:

1) For the case of load side linear scaling, changing the dimensional unit between meters (metric) and inches (English) will not result in an accurate conversion of data values to the new dimensional unit. The change of the linear dimensional unit will result only in a decimal point shift (scaling exponent change) to the left (change meter inches) or to the right (inches meters). It is therefore recomended that the linear dimensional unit be selected once and not changed. If the unit must be changed, then all operational data values must be corrected and scaled to reflect the new unit.

2) Preferred parameter scaling will automatically be selected if you use the parameter/scaling & mechanical setup dialog in DriveTop.

Preferred scaling will result in the following resolution:
Resolution with linear scaling: 10^{-6} m/min, 10^{-5} in/min
Resolution with rotary scaling: 10^{-4} rpm, 10^{-6} rev/s

3) See also example under S-0-0045, Velocity Data Scaling Factor.

S-0-0044 - Attributes

Name in German:	Wichtungsart für Geschwindigkeitsdaten		
Name in English:	Velocity data scaling type		
ID number:	S-0-0044	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Check_P3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	1010 b

S-0-0045, Velocity Data Scaling Factor

Description:

The scaling factor for all velocity data in the drive will be determined in this parameter.

If a preferred scaling is set with **S-0-0044, Velocity data scaling type**, this parameter will be set to 1.

Example: Suppose that loadside linear scaling is desired with velocity units in meters/min. The DriveTop application parameter/scaling/mechanical program sets the preferred velocity scaling values through the value dialog.

S-0-0045, velocity data scaling factor 1

S-0-0046, Velocity data scaling expanent -6

S-0-0049, Velocity data scaling type 100 100 1 b

Bit 2 -0 = 001 linear scaling

Bit 3 = 1 (Preferred) Parameter

Bit 4 = 0 Dimensional unit is meters (m)

Bit 5 = 0 Time unit is minutes (min)

Bit 6 = 1 Data referenced al load

Now suppose that a value of +1234567 is stored in the relavent velocity datum register. This datum value will be interpreted and displayed as:

$+1234567 \times 1 \times 10^{-6}$ m/minor

or

$+1234467 \times 10^{-3}$ mm/min

or

As the value would be displayed in the IDN lists, +1234.567 mm/min with respect to the load. Note that the least significant decimal value is determined by the scaling exponent, in this example, as 10-6 m/min or 10-3 mm/min.

S-0-0045 - Attributes

Name in German:	Wichtungs-Faktor für Geschwindigkeitsdaten		
Name in English:	Velocity data scaling factor		
ID number:	S-0-0045	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	MDT
Input value min / max:	1/65535	**Default value:**	1

S-0-0046, Velocity Data Scaling Exponent

Description:

The scaling exponent for all velocity data in the drive will be determined in this parameter.

S-0-0046 - Attributes

Name in German:	Wichtungs-Exponent Geschwindigkeitsdaten		
Name in English:	Velocity data scaling exponent		
ID number:	S-0-0046	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	MDT
Input value min / max:	32/32	**Default value:**	-4

See also example under S-0-0045, Velocity Data Scaling Factor.

S-0-0047, Position Command Value

Description:

For the step motor interface, the position command value will be determined through the evaluation of the step-pulse signals present at this interface. The position command value that is determined is this fashion can be read here.

For the positioning interface, the position command value will be generated by the internal position command value interpolator. The active position command value can be read here.

S-0-0047-Attributes

Name in German:	Lage-Sollwert		
Name in English:	Position Command Value		
ID number:	S-0-0047	**Editability:**	P234
Function:	Parameter	**Memory:**	no
Data length:	4 Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	MDT
Input value min / max:	S-0-0076/S-0-0076	**Default value:**	--

S-0-0049, Positive position limit value

Description:

The "Positive position limit value" describes the maximum extent of travel in a positive direction.

The position limit is only active if all position data is referenced to the home point, i.e., the drive is homed. (Bit 0 in parameter **S-0-0403,** P**osition feedback value status is** set to 1). The position limit values can be switched off through bit 4 in the **S-0-0055, Position polarity parameter** .

If a **target position** on the other side of the position limit is set in the drive, the warning **E253, Target position beyond the travel range** will be generated.

S-0-0049 - Attributes

Name in German:	Lage-Grenzwert positiv		
Name in English:	Positive position limit value		
ID number:	S-0-0049	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	S-0-0076/S-0-0076	**Default value:**	+10000.00 Deg

S-0-0050, Negative position limit value

Description:

The "Negative position limit value" describes the maximum extent of travel in a negative direction.

The position limit is only active if all position data is referenced to the home point, i.e., the drive is homed. (Bit 0 in parameter **S-0-0403,** P**osition feedback value status is** set to 1). The position limit values can be switched off through bit 4? in the **S-0-0055, Position polarity parameter** .

If a target position on the other side of the position limit is set in the drive, the warning **E253, Target position beyond the travel range** will be generated.

S-0-0050 - Attributes

Name in German:	Lage-Grenzwert negativ		
Name in English:	Negative position limit value		
ID number:	S-0-0050	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	S-0-0076/S-0-0076	**Default value:**	-10000.00 Deg

S-0-0051, Position Feedback Value 1 (Motor Feedback)

Description:

The "Position feedback value 1 (Motor feedback)" represent the current position of the rotational feedback. This value is updated each 500ms. (This can be read over the serial interface).

S-0-0051 - Attributes

Name in German:	Lage-Istwert-1		
Name in English:	Position Feedback Value 1 (Motor Feedback)		
ID number:	S-0-0051	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	4 Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	no
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	AT
Input value min / max:	--/--	**Default value:**	--

S-0-0052, Reference Distance 1

Description:

This parameter represents the distance between the machine zero point and the home point for the motor measurement system (Position feedback value 1).

After the command **S-0-0148, C6 Drive controlled homing procedure** has been executed, the drive will set the **Position Command Value, S-0-0047** and the P**osition feedback value "9.8 Drive Controlled Homing Procedure" S-0-0051** to this value.

S-0-0052 - Attributes

Name in German:	Referenzmaß Lage-Istwert 1		
Name in English:	Reference distance 1		
ID number:	S-0-0052	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	S-0-0076/S-0-0076	**Default value:**	+0.00 Deg

S-0-0055, Position Polarity Parameter

Description:

This parameter can be used to invert the polarities of the given position data. These polarities will be switched outside of the control system position regulator (i.e., at the command and feedback valueinput to and actual value output from the control system).

Since the position data from the rotational feedback will be inverted, a different numeric value will result.

The following applies to rotary motors:

"Motor-clockwise rotation" = the motor shaft turns in clockwise direction (Facing the motor shaft) if the position command value difference and the position feedback polarity are both positive.

Bit 4 is used to activate or deactivate product position limits.

Structure of the parameter:

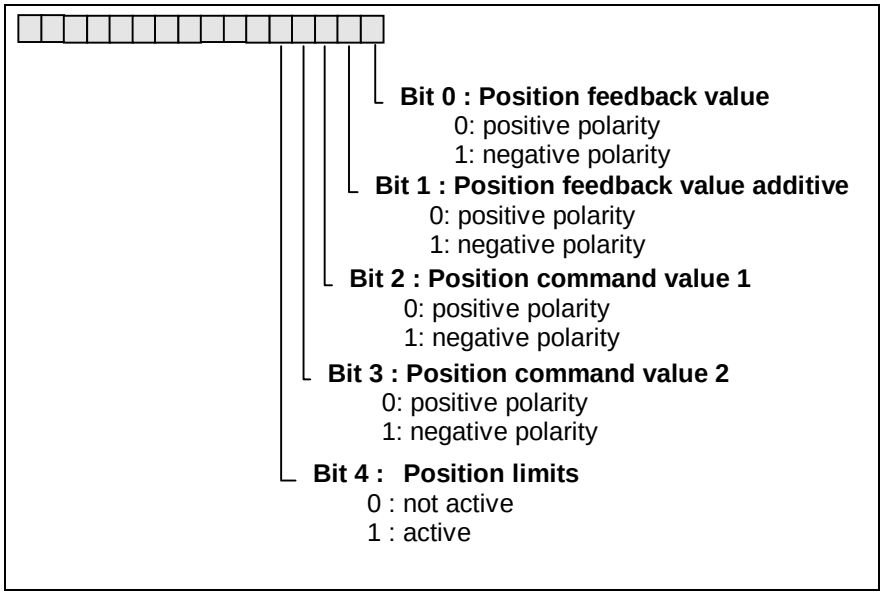

Bit 0 : Position feedback value
0: positive polarity
1: negative polarity
Bit 1 : Position feedback value additive
0: positive polarity
1: negative polarity
Bit 2 : Position command value 1
0: positive polarity
1: negative polarity
Bit 3 : Position command value 2
0: positive polarity
1: negative polarity
Bit 4 : Position limits
0 : not active
1 : active

Figure 2-5: S-0-0055, Position Polarity Parameter

Note: Only the bits named here are supported by the product. If bit 0 is altered by the control system, the drive will also set the value for bits 1 - 3 to match the value of bit 0.

S-0-0055 - Attributes

Name in German:	Lage-Polaritäten-Parameter		
Name in English:	Position Polarity Parameter		
ID number:	S-0-0055	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/31	**Default value:**	0b

S-0-0057, Position Window

Description:

The drive will set the ouput "In Position" when the amount of the difference between the position feedback value and the position command value is less than the value of the position window.

During the command **S-0-0148, C6 Drive controlled homing procedure**, this parameter is used to signal the end of the command through the INPOS-output if the position feedback value enters into the home region ± S-0-0057.

G-Types - In-Pos functions as described during S-0-0148 parameter Command

K-Types - Old firmware S-0-0148 used to return to home. This command can no longerbe executed with K-type Fb's. Results in C6/04 diagnostic.

S-0-0057 - Attributes

Name in German:	Positionierfenster		
Name in English:	Position window		
ID number:	S-0-0057	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0076	**Default value:**	+10.00 Deg

S-0-0059, Position Switch Flag Parameter

Description:

The flag for the position switch point is dependent on the position feedback value.

If S-0-0051 Position feedback value 1 is less than S-0-0060, Position switch point, the corresponding flag is set to 0. If the position feedback value is larger than or equal to the position switch point, the corresponding flag will be set to 1. The status of the output "path switch point" at pinx2/19 corresponds to this flag.

S-0-0059 - Attributes

Name in German:	Positionsschaltpunkt - Parameter		
Name in English:	Position switch flag parameter		
ID number:	S-0-0059	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	binary	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0060, Position Switch Point 1

The position switches are made up of a position switch point and a position switch point-flag. If the position feedback value is less than the position switch point, the corresponding flag will be set to 0. If the position feedback value is larger than or equal to the position switch point, the corresponding flag will be set to 1.

S-0-0060 - Attributes

Name in German:	Positionsschaltpunkt 1		
Name in English:	Position Switch point 1		
ID number:	S-0-0060	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	Param E2prom
Data length:	4 Byte	**validity check:**	yes
Format:	S-0-0076	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	+0.00 Deg

S-0-0076, Position Data Scaling Type

Description:

Various scaling types for the position data in the drive can be set as described below. This parameter determines the scaling of all parameters with units of linear or rotary position or displacement.

Structure of the parameter:

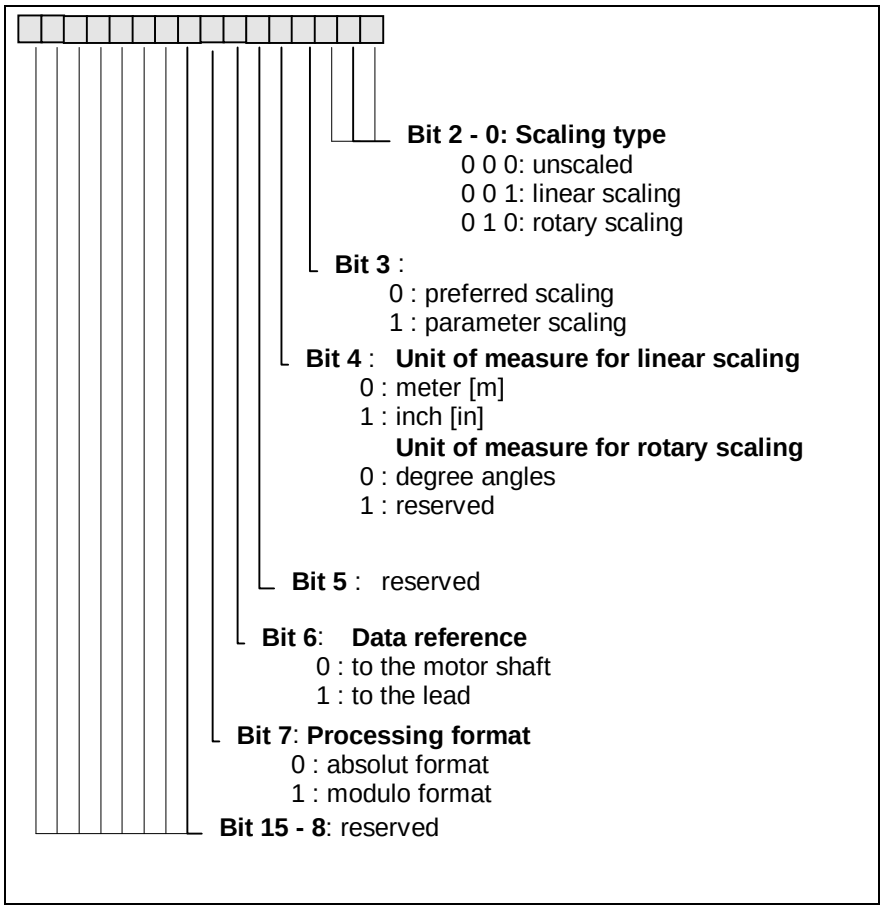

Bit 2 - 0: Scaling type
0 0 0: unscaled
0 0 1: linear scaling
0 1 0: rotary scaling
Bit 3 :
0 : preferred scaling
1 : parameter scaling
Bit 4 : Unit of measure for linear scaling
0 : meter [m]
1 : inch [in]
Unit of measure for rotary scaling
0 : degree angles
1 : reserved
Bit 5 : reserved
Bit 6: Data reference
0 : to the motor shaft
1 : to the lead
Bit 7: Processing format
0 : absolut format
1 : modulo format
Bit 15 - 8: reserved

Figure 2-6: S-0-0076, Position Data Scaling Type

Note: Only the bits named here are supported by the product.

Notes:

1) Same as S-0-0044 Note 1

2) Same as S-0-0044 Notes 2

3) See example"Parameter Scaling Position Data" under S-0-0077

S-0-0076 - Attributes

Name in German:	Wichtungsart für Lagedaten		
Name in English:	Position Data Scaling Type		
ID number:	S-0-0076	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	1010b

S-0-0077, Linear Position Data Scaling Factor

Description:

This ID number contains the scaling factor that is to be used to scale all position data in the drive.

The parameter is set to 1 if linear preferred scaling has been setin Bit 3 of **S-0-0076, Position Data Scaling Type**.

Example:

Suppose that loadside, linear scaling is desried with dimensional units in meters. the parameter 1 Scaling /mechanical system dialog in DriveTop will set the position data scaling options on the drive as follows:

Parameter

S-0-0076, Position Data Scaling Type	Value 01001001
Bit 2-0:	001, linear scaling
Bit 3:	1, (Preferred)Parameter Scaling
Bit 4:	0, Dimensional unit is meters (m)
Bit 6:	1, Data Referenced at the load
Bit 7:	0, Absolute processing format
S-0-0077, Linear Position Data Scation Factor	1
S-0-0078, Linear Position Data Scaling Exponent	-6

Now supposeth that the decimal value of +1234567 is stored in the relavent position datta register. This datum value will be interpreted and displayed as:

+1234567X1X10^{-3} mm (Millimeters)

or

as the value would be displayed in the IDN lists, +1234.567 mm with respect ot the laod. Note that the least significant decimal value is determined by the scaling exponent, in this example, as 10^{-6} m or 10^{-3} mm.

S-0-0077 - Attributes

Name in German:	Wichtungs-Faktor transl. Lagedaten		
Name in English:	Linear Position Data Scaling Factor		
ID number:	S-0-0077	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/65535	**Default value:**	1

S-0-0078, Linear Position Data Scaling Exponent

Description:

This ID number contains the scaling exponent that is to be used to scale all position data in the drive if linear scaling has been selected.

If linear preferred scaling is selected, this parameter will be set by the drive.

S-0-0078 - Attributes

Name in German:	Wichtungs-Exponent transl. Lagedaten		
Name in English:	Linear Position Data Scaling Exponent		
ID number:	S-0-0078	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	32/32	**Default value:**	-6

S-0-0079, Rotational Position Resolution

Description:

If rotary position scaling is selected, the LSB valence for all position data will be set in this parameter.

The LSB bit can be specified in the following manner:

Example:

If you would like a resolution of 0.01 degrees for the LSB, a value of 36,000 must be parameterized.

If a preferred scaling was set in the parameter **S-0-0076, Position Data Scaling Type**, the rotational position resolution will be set at 3,600,000. That means that the resolution for the LSB will be 0.0001 degrees.

S-0-0079 - Attributes

Name in German:	Rotations-Lageauflösung		
Name in English:	Rotational position resolution		
ID number:	S-0-0079	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/4294967295	**Default value:**	36000

S-0-0080, Torque/Force Command Value

Description:

This parameter shows the drive's current torque/force command value.

The evaluation is dependent upon the scaling of the torque and force data (z.Z. = at present, only percentage scaling is supported).

100% = Motor continous stand still torque, Mdn

S-0-0080 - Attributes

Name in German:	Drehmoment/Kraft-Sollwert		
Name in English:	Torque/Force Command Value		
ID number:	S-0-0080	**Editability:**	P234
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0086/S-0-0086	**combination check:**	no
Posit. after the dec.:	S-0-0086	**cyc. transmittable:**	MDT
Input value min / max:	S-0-0086/S-0-0086	**Default value:**	+0.0%

S-0-0084, Torque/Force Feedback Value

Description:

This parameter represents the motor's current torque feedback value.

The evaluation is dependent upon the scaling of the torque and force data (z.Z = e.g., only percentage scaling is supported).

100% = Motor stand still torque

S-0-0084 - Attributes

Name in German:	Drehmoment/Kraft-Istwert		
Name in English:	Torque/Force Feedback Value		
ID number:	S-0-0084	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	no
Unit German/English:	S-0-0086/S-0-0086	**combination check:**	no
Posit. after the dec.:	S-0-0086	**cyc. transmittable:**	AT
Input value min / max:	S-0-0086/S-0-0086	**Default value:**	--

S-0-0085 Torque Polarity Parameter

Description:

The polarities for the given torque data that is related to the application can be switched in this parameter.

The polarity will be switched externally (at the command & feedback value input and actual value output) not inside the controlled system.

The following applies to rotary motors:

Clockwise rotation when facing the motor shaft is the rule for a positive torque command value and a positive torque feedback value polarity.

Structure of the parameter:

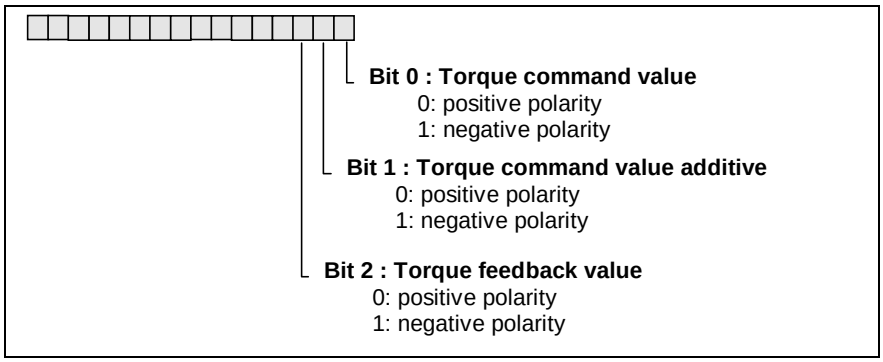

Bit 0 : Torque command value
0: positive polarity
1: negative polarity
Bit 1 : Torque command value additive
0: positive polarity
1: negative polarity
Bit 2 : Torque feedback value
0: positive polarity
1: negative polarity

Figure 2-7: S-0-0085, Torque/Force Polarity Parameter

Note: If bit 0 is altered, the drive will also set the value of bits 1 - 2 to match the value of bit 0.

S-0-0085 - Attributes

Name in German:	Drehmoment-Polaritäten-Parameter		
Name in English:	Torque polarity parameter		
ID number:	S-0-0085	**Editability:**	P23
Function:	Parameter	**Memory:**	Param E^2Prom
Data length:	2 Byte	**validity check:**	Phase 3
Format:	BIN	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	0b

S-0-0086, Torque/Force Data Scaling Type

Description:

At the present time only the percentage scaling for the torque force data is supported.

The following applies:

100 % = **S-0-0111, Motor current at standstill**

S-0-0086 - Attributes

Name in German:	Wichtungsart für Drehmoment-Kraftdaten		
Name in English:	Torque/Force data scaling type		
ID number:	S-0-0086	**Editability:**	23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	0	**cyc. transmittable:**	MDT
Input value min / max:	--/--	**Default value:**	0b

S-0-0091, Bipolar Velocity Limit Value

Description:

The "bipolar velocity limit value" describes the maximum allowable velocity that is symmetrical in both directions. The maximun input value is restricted by **S-0-0113, Motor-maximum speed**.

S-0-0091 - Attributes

Name in German:	Geschwindigkeits-Grenzwert bipolar		
Name in English:	Bipolar Velocity Limit Value		
ID number:	S-0-0091	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	S-0-0044/S-0-0044	**combination check:**	no
Posit. after the dec.:	S-0-0044	**cyc. transmittable:**	MDT
Input value min / max:	0/S-0-0113		
Default value:	+3000, 0000 RPM		

S-0-0092, Bipolar Torque/Force Limit Value

Description:

This parameter describes the maximum allowable torque that is symmetrical in both directions (accelerating, braking).

The evaluation refers to the percentage of the motor current at standstill.

100% = Motor current at standstill

Note: The maximum torque is also influenced by:

- **P-0-0006, Overload factor**
- **P-0-4011, Switching Fregquency**

S-0-0092 - Attributes

Name in German:	Drehmoment/Kraft-Grenzwert bipolar		
Name in English:	Bipolar Torque/Force Limit Value		
ID number:	S-0-0092	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0086/S-0-0086	**combination check:**	no
Posit. after the dec.:	S-0-0086	**cyc. transmittable:**	MDT
Input value min / max:	0/calculated peak torque		
Default value:	+500.0%		

S-0-0093, Torque/Force Data Scaling Factor

Description:

The scaling factor for all torque/force data in the drive are set in this parameter.

The parameter has no meaning at the present time because only percentage scaling can be set for torque and force data.

S-0-0093 - Attributes

Name in German:	Wichtungs-Faktor für Drehmoment-Kraftdaten		
Name in English:	Torque/Force data scaling factor		
ID number:	S-0-0093	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/65535	**Default value:**	1

S-0-0094, Torque/Force Data Scaling Exponent

Description:

The scaling exponent for all torque/force data in the drive are set in this parameter.

The parameter has no meaning at the present time because only percentage scaling can be set for torque and force data.

S-0-0094 - Attributes

Name in German:	Wichtungs-Exponent für Drehmoment-Kraftdaten		
Name in English:	Torque/Force data scaling exponent		
ID number:	S-0-0094	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	-1

S-0-0095, Diagnostic Message

Description:

The operating status for the drive that is relevant at the moment can be read in text form in this parameter.

The respective diagnostic message number from **P-0-0001, Diagnostic Message Nummer** will appear in front of this parameter.

Example: "A010 Drive Halt "

S-0-0095 - Attributes

Name in German:	Diagnostic		
Name in English:	Diagnostic Message		
ID number:	S-0-0095	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	1 byte variable, up to 40 characters		
validity check:	no		
Format:	ASCII	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0097, Mask Class 2 Diagnostic

Description:
This parameter is not used in DKC01/DKC11.

S-0-0097 - Attributes

Name in German:	Maske Zustandsklasse 2		
Name in English:	Mask class 2 diagnostic		
ID number:	S-0-0097	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--		
Default value:	1111 1111 1111 1111 b		

S-0-0098, Mask Class 3 Diagnostic

Description:
This parameter is not used in DKC01/DKC11.

S-0-0098 - Attributes

Name in German:	Maske Zustandsklasse 3		
Name in English:	Mask class 3 diagnostic		
ID number:	S-0-0098	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--		
Default value:	1111 1111 1111 1111 b		

S-0-0099, Reset Class 1 Diagnostic

Description:

This command can be activated with the S1 key on the controller or through the serial interface. All errors in the drive will be cleareddeleted when this command is started through the serial interface. The drive will switch to the "ready for operation" status if no further errors exist.

If the " Reset class 1 diagnostic" command is started with the S1 key, only one error will be deleted at a time. If the drive has stored several errors (up to 4 errors), a diagnostic message that corresponds to each error will appear sequentially each time the S1 key is pressed.

see also Function description: "Initiating a command"

S-0-0099 - Attributes

Name in German:	Reset Zustandsklasse-1		
Name in English:	Reset class 1 diagnostic		
ID number:	S-0-0099	**Editability:**	P234
Function:	Command	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/11 b	**Default value:**	--

Exception: Erro “F2/26 undervoltage in the power section” is cleared by removing the drive enable, signal (Rf = 0) at pin X2-2.

S-0-0100, Velocity Loop Proportional Gain

Description:

This parameter contains the value for the velocity loop proportional gain.

The option is available to load motor-specific default values for the control loop parameters with the "Basic load" command.

see also Function description: "Setting the velocity loop"

S-0-0100 - Attributes

Name in German:	Geschwindigkeitsregler-Proportionalverstärkung		
Name in English:	Velocity Loop Proportional Gain		
ID number:	S-0-0100	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	As/rad/As/rad	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	0/312.9	**Default value:**	.07 A/rad/s

S-0-0101, Velocity Loop Integral Action Time

Description:

The velocity controller forms a current command value from the difference between the velocity command value and the velocity feedback value (= speed regulation deviation).

This current command value consists of a proportional component and an integral component. The Velocity Loop Integral Action Time corresponds to the time in which the integral component of the current command value is growing on the value of the proportional component.

Definition of the Integral Action Time

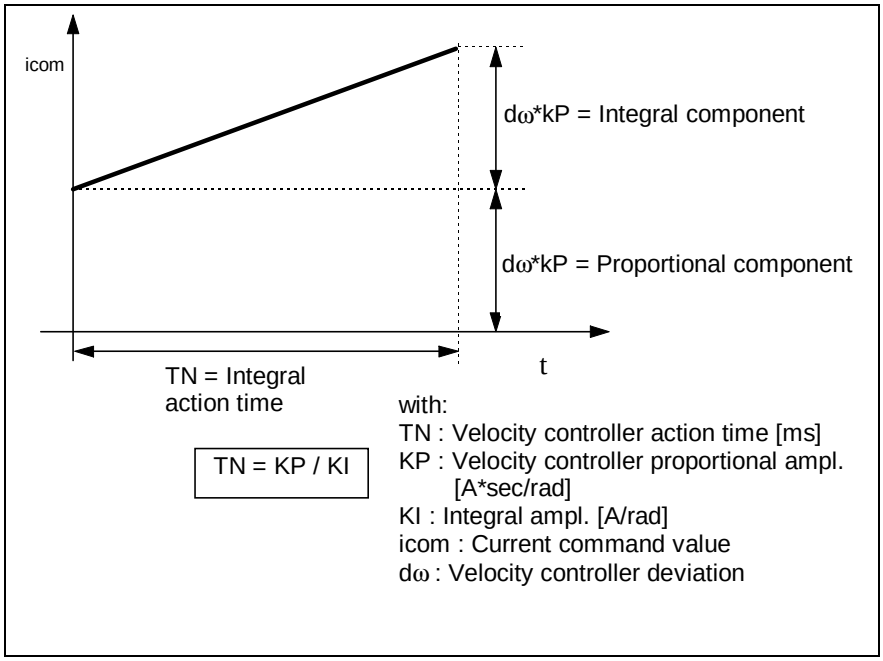

icom
dω*kP = Integral component
dω*kP = Proportional component
t
TN = Integral action time
TN = KP / KI
with:
TN : Velocity controller action time [ms]
KP : Velocity controller proportional ampl. [A*sec/rad]
KI : Integral ampl. [A/rad]
icom : Current command value
dω : Velocity controller deviation

Figure 2-8: Integral Action Time

The value of the time axis for which the integral component is equal to the proportional component is described as integral action time, ie t=TN when icmd =2xdw*KP.

The integral gain component is disabled with the input value TN= 0sec.

see also Function description: "Setting the velocity loop"

S-0-0101 - Attributes

Name in German:	Geschwindigkeitsregler-Nachstellzeit		
Name in English:	Velocity Loop Integral Action Time		
ID number:	S-0-0101	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	ms/ms	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	2/3276.7	**Default value:**	15.0 ms

S-0-0103, Modulo Value

Description:

When Modulo format that is set (Parameter **S-0-0076, Position scaling** bit 7) the position data in the range from 0 to the module value, S-0-0103 can be represented. For monotonicly increasing position data, when the position value equals the module vlaue, the position data is set to and overflows fro zero. If the position data are represented in modulo format the input range for all position data must be between zero and the **modulo value** .

see also Function description: "Boundary conditions for modulo processing"

S-0-0103 - Attributes

Name in German:	Modulowert		
Name in English:	Modulo Value		
ID number:	S-0-0103	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0076	**Default value:**	+360.00 Deg

S-0-0104, Position Controller KV-Factor (closed-loop control)

Description:

This parameter contains the value for the proportional gain of the position loop Controller.

The option is available to load a default value for this control loop parameter with the "Basic load" command.

see also Function description: "Determining the position controller setting"

S-0-0104 - Attributes

Name in German:	Lageregler KV-Faktor		
Name in English:	Position Loop KV-Factor		
ID number:	S-0-0104	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	1000/min/1000/min	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0,02/239	**Default value:**	1000/min

S-0-0106, Current Controller, Proportional Gain 1

Description:

This parameter represents the proportional gain of the current controller .

The current controller proportional gain is determined for each of the motor-drive combinations. It depends on the type of motor and may not be changed. It can be determined with the "Basic load" command or from the motor data sheets.

see also Function description: "Setting the current controller"

S-0-0106 - Attributes

Name in German:	Stromregler-Proportionalverstaerkung 1		
Name in English:	Current Controller Proportional Gain 1		
ID number:	S-0-0106	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	V/A/V/A	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0/500	**Default value:**	30.00 V/A

S-0-0107, Current Controller Integral Action Time 1

Description:

The value of this parameter depends on the motor and can be found in the motor data sheet.

2ms will be loaded for the current contorller integral action time 1 with the command "Basic load".

see also Function description: "Setting the current controller"

S-0-0107 - Attributes

Name in German:	Stromregler-Nachstellzeit-1		
Name in English:	Current Controller Integral Action Time 1		
ID number:	S-0-0107	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	ms/ms	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	0.1/6553.5	**Default value:**	--

S-0-0108, Feedrate Override

Description:

The feedrate override only works for "drive controlled motion commands" like:

- "Drive controlled homing procedure" command
- "Programmed positioning block " operating mode
- Jogging operation

In such instances , the drive calculates the velocity command value itself. The feedrate override has a multiplying effect on the homing velocity, the block velocity and the jog velocity.

S-0-0108 - Attributes

Name in German:	Feedrate-Override		
Name in English:	Feedrate override		
ID number:	S-0-0108	**Editability:**	P4
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	%/%	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0/655,35	**Default value:**	100.00 %

Note: Feedrate override may be controlled either by this parameter or by the analog E-E2 input depending on the value set in Bit 0 of the function parameter, P-0-4027.

Bit 0: 0 = Feedrate override set in parameter S-0-0108

1 = Feedrate override via analog channel E1-E2

S-0-0109, Motor Peak Current

Description:

Describes the maximum current that can flow in the motor without damaging the motor.

If the motor's peak current is less than the amplifier's peak current, the maximum current that is available will be automatically limited to the motor's peak current.

This value is stored in motor feedback for MDD and MKD motors and will be uploaded to the controller ram when the controller is turned on.

S-0-0109 - Attributes

Name in German:	Spitzenstrom Motor		
Name in English:	Motor Peak Current		
ID number:	S-0-0109	**Editability:**	no
Function:	Parameter	**Memory:**	Feedb.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	0/500	**Default value:**	--

S-0-0110, Amplifier Peak Current

Description:

Peak current available from the drive controller . The value will be set by the drive itself. This current is only available for short dusations .

S-0-0110 - Attributes

Name in German:	Spitzenstrom Verstärker		
Name in English:	Amplifier Peak Current		
ID number:	S-0-0110	**Editability:**	no
Function:	Parameter	**Memory:**	Fixed -E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	0.001/500	**Default value:**	--

S-0-0111, Motor Current at Standstill

Description:

The "motor current at standstill" is the continous motor current capability at standstill according to the motor data sheet.

This value is stored in motor feedback for MDD and MKD motors and will be loaded into the controller ram when the controller is turned on.

All torque / force data refer to motor current at standstill = 100%

S-0-0111 - Attributes

Name in German:	Stillstandstrom Motor		
Name in English:	Motor Current at Standstill		
ID number:	S-0-0111	**Editability:**	no
Function:	Parameter	**Memory:**	Feedb.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	0/500	**Default value:**	--

S-0-0112, Amplifier Nominal Current

Description:

Allowable continious current output for the drive controller . The value will be set by the drive itself.

S-0-0112 - Attributes

Name in German:	Nennstrom Verstärker		
Name in English:	Amplifier Nominal Current		
ID number:	S-0-0112	**Editability:**	no
Function:	Parameter	**Memory:**	Fixed-E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	0.001/500	**Default value:**	--

S-0-0113, Maximum Motor Speed (nmax)

Description:

The maximum velocity for the motor cannot be exceeded. It also limits the **S-0-0091, Bipolar velocity limit value** parameter.

This value is stored in motor feedback for MDD and MKD motors and will be loaded into the controller ram when the controller is turned on.

In Torque regulation, if the maximum motor speed is exceeded by more than 12.5%, the drive will be switched into a torque free state and the error message **F879, Velocity limit value exceeded** will result.

S-0-0113 - Attributes

Name in German:	Maximalgeschwindigkeit des Motors		
Name in English:	Maximum Motor Speed (nmax)		
ID number:	S-0-0113	**Editability:**	P23
Function:	Parameter	**Memory:**	Feedb. E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	S-0-0044/S-0-0044	**combination check:**	no
Posit. after the dec.:	S-0-0044	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0044	**Default value:**	--

S-0-0116, Resolution of Rotational Feedback 1

Description:

For motors with resolver feedback, the resolution of the rotational feedback is equal to the number of motor pole pairs . That means that a motor with 4 pole pairs has a resolver with 4 electrical cycles per motor mechanical revolution.

This value is stored in feedback memory and cannot be changed.

S-0-0116 - Attributes

Name in German:	Rotationsgeber-1 Auflösung		
Name in English:	Resolution of rotational feedback 1		
ID number:	S-0-0116	**Editability:**	P23
Function:	Parameter	**Memory:**	Feedb.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	Zykl/Umdr bzw. mm (von P-0-4014 abhängig) /Cycl/Rev or inch (depending on P-0-4014)		
combination check:	no		
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0121, Input Revolutions of Load Gear

Description:

A mechanical gear will often be employed between the motor and the load.

The gear ratio is defined by:

$$\frac{\text{Output Revolutions of load Gear}}{\text{Input Revolutions of load Gear}}$$

Figure 2-9: Gear Ratio

see also Function description: "Bondary conditions for modulo processing"

Example:

5 motor rotations result is 2 output gear rotations

S-0-0121 : 5

S-0-0122 : 2

S-0-0121 - Attributes

Name in German:	Input revolutions of load gear		
Name in English:	Input revolutions of load gear		
ID number:	S-0-0121	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/Rev	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/4294967295	**Default value:**	1 Rev

S-0-0122, Output Revolutions of Load Gear

Description:

A mechanical gear will often be employed between the motor and the load.

The gear ratio is defined by:

$$\frac{\text{Input Revolutions of load Gear (S-0-0121)}}{\text{Output Revolutions of load Gear (S-0-0122)}}$$

Figure 2-10: Gear Ratio

Example:

5 motor rotations result is 2 output gear rotations

S-0-0121 : 5

S-0-0122 : 2

S-0-0122 - Attributes

Name in German:	Lastgetriebe-Ausgangsumdrehungen		
Name in English:	Output revolutions of load gear		
ID number:	S-0-0122	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/Rev	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/4294967295	**Default value:**	1 Rev

S-0-0123, Feed Constant

Description:

This parameter describes the conversion from rotary to linear motion . It is defined as the linear displacement of the load measrued during one rotation of the loadside gear drive shaft.

Ball screw spindle:	Rack and pinion:
Feed constant=pitch of screw (typical value 10.00 mm)	Feed constant= actual pitch diameter for the pinion * Pi

Figure 2-11: Characteristic value for the feed constant

S-0-0123 - Attributes

Name in German:	Feed Constant		
Name in English:	Feed constant		
ID number:	S-0-0123	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	5	**cyc. transmittable:**	no
Input value min / max:	--/--		
Default value:	10 000. 00 mm/rev		

S-0-0124, Standstill window

Description:

The motor's standstill is defined by that condition that the value of the **Velocity Feedback Value, S-0-0040** remains below the threshold for which can be set in this parameter (the "Standstill window").

In standstill the output signal "In motion" will be removed .

S-0-0124 - Attributes

Name in German:	Stillstandsfenster		
Name in English:	Standstill window		
ID number:	S-0-0124	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0044/S-0-0044	**combination check:**	no
Posit. after the dec.:	S-0-0044	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0044	**Default value:**	10.0000 Rpm

S-0-0127, C1 Communication Phase 3 Transition Check

Description:

The commands "S-0-0127, C1 Communication phase 3 transition check and "**S-0-0128, C2 Communication phase 4 transition check**" are used to switch form the parameteri mode to the operating mode.

When the "**S-0-0127, C1 Communication phase 3 transition check**" command is used, the validity of all of the interface parameters will be checked. If any of the parameters are found invalid, the drive ends the command with an error message.

see also Function description: "Initiating a command"

S-0-0127 - Attributes

Name in German:	C1 Umschaltvorbereitung auf Komm.-Phase3		
Name in English:	C1 Communication phase 3 transition check		
ID number:	S-0-0127	**Editability:**	P2
Function:	Command	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/11 b	**Default value:**	--

S-0-0128, C2 Communication Phase 4 Transition Check

Description:

The commands S-0-0127, C1 Communication phase 3 transition check **and** S-0-0128, C2 Communication phase 4 transition check" are used to switch form the parametermode to the operatemode.

When the **S-0-0128, C2 Communication phase 4 transition check** command is executed , all parameters will be checked for validity and limit value encroachments. If any invalid parameters or any limit values have been encroached upon, the drive would end the command with an error message.

see also Function description: "Initiating a command"

S-0-0128 - Attributes

Name in German:	C2 Umschaltvorbereitung auf Komm.- Phase 4		
Name in English:	C2 Communication phase 4 transition check		
ID number:	S-0-0128	**Editability:**	P3
Function:	Command	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/11 b	**Default value:**	--

S-0-0135, Drive Status Word

Description:

This parameter makes it possible to read the drive status word through the serial interface.

It is structured as follows:

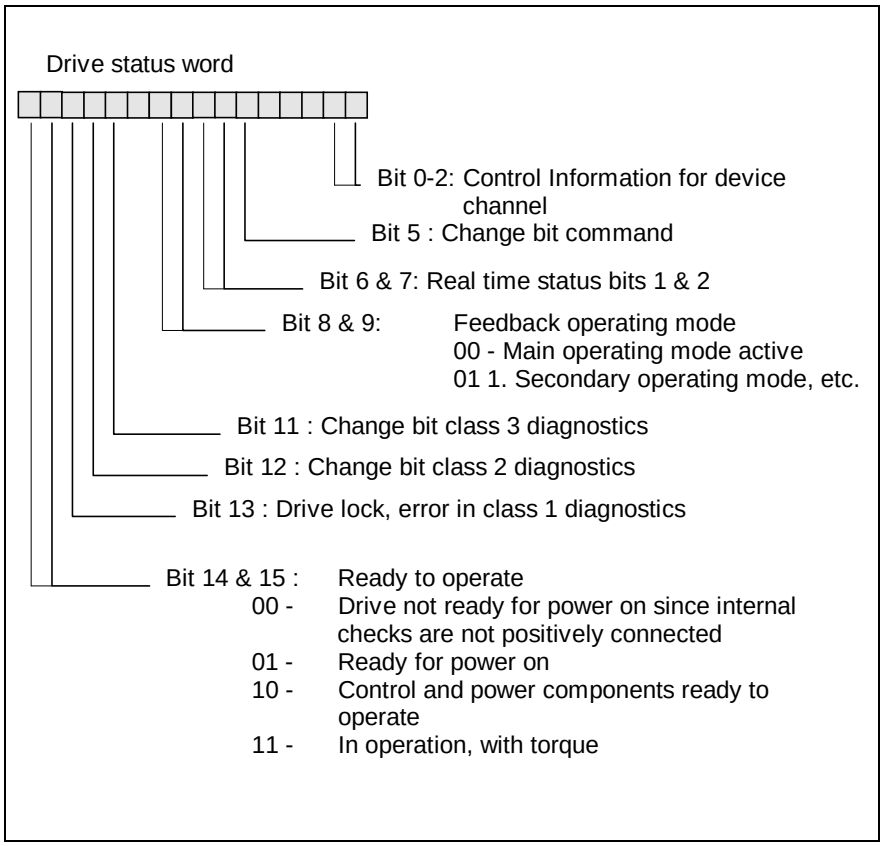

Drive status word
Bit 0-2: Control Information for device channel
Bit 5 : Change bit command
Bit 6 & 7: Real time status bits 1 & 2
Bit 8 & 9: Feedback operating mode
00 - Main operating mode active
01 1. Secondary operating mode, etc.
Bit 11 : Change bit class 3 diagnostics
Bit 12 : Change bit class 2 diagnostics
Bit 13 : Drive lock, error in class 1 diagnostics
Bit 14 & 15 : Ready to operate
00 - Drive not ready for power on since internal checks are not positively connected
01 - Ready for power on
10 - Control and power components ready to operate
11 - In operation, with torque

Figure 2-12: Structure of the Drive Status Word

S-0-0135 - Attributes

Name in German:	Antriebs - Status		
Name in English:	Drive - status - word		
ID number:	S-0-0135	**Editability:**	--
Function:	Parameter	**Memory:**	--
Data length:	2 Byte	**validity check:**	no
Format:	binary	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0138, Bipolar Acceleration Limit Value

Description:

The " bipolar accelaration, " describes the maximum allowable accelaration that is symmetrical in both directions (acceleration and decelaration).

When "Alt Drive halt " is used, the drive brakes with this decelaration until the velocity = 0.

During the jogging operation, the drive accelerates and brakes at this decelaration .

S-0-0138 - Attributes

Name in German:	Beschleunigung bipolar		
Name in English:	Bipolar acceleration limit value		
ID number:	S-0-0138	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0160/S-0-0160	**combination check:**	no
Posit. after the dec.:	S-0-0160	**cyc. transmittable:**	MDT
Input value min / max:	0/S-0-0160	**Default value:**	+1000.000 rad/s2

S-0-0140, Controller Type

Description:

The device type of the manufacturer can be found in text form in the operating data for the controller type.

Example:

DKC01.1-040-7

S-0-0140 - Attributes

Name in German:	Control Device Type		
Name in English:	Controller Type		
ID number:	S-0-0140	**Editability:**	no
Function:	Parameter	**Memory:**	Fixed -E²prom
Data length:	1Byte variable	**validity check:**	Phase3
Format:	ASCII	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0141, Motor Type

Description:

The company name and the motor type of the connected motor can be found in the operating data for the motor type in text form.

This value is stored for MDD and MKD motors in the motor feedback and will be loaded from thereinto the controller Ram when the drive is started for the first time.

Example:

MDD 065A-N040-N2L-095GB0

or

MKD 071B-061-KP1-BN

S-0-0141 - Attributes

Name in German:	Motortyp		
Name in English:	Motor Type		
ID number:	S-0-0141	**Editability:**	P23
Function:	Parameter	**Memory:**	Feedb.E²prom
Data length:	1Byte variable	**validity check:**	Phase3
Format:	ASCII	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0142, Application Type

Description:

A descriptive name for the drive can be stored in this parameter (e.g., swivel axis). It has no functional significance.

S-0-0142 - Attributes

Name in German:	Anwendungsart		
Name in English:	Application type		
ID number:	S-0-0142	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	1Byte variable, max. 40 characters		
validity check:	Phase3		
Format:	ASCII	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	Default

S-0-0147, Homing Parameter

Description:

The processes for the D**rive controlled homing procedure, S-0-0148** in relation to the machine layout , NC and drive installation will be set in this parameter.

Structure of the parameter:

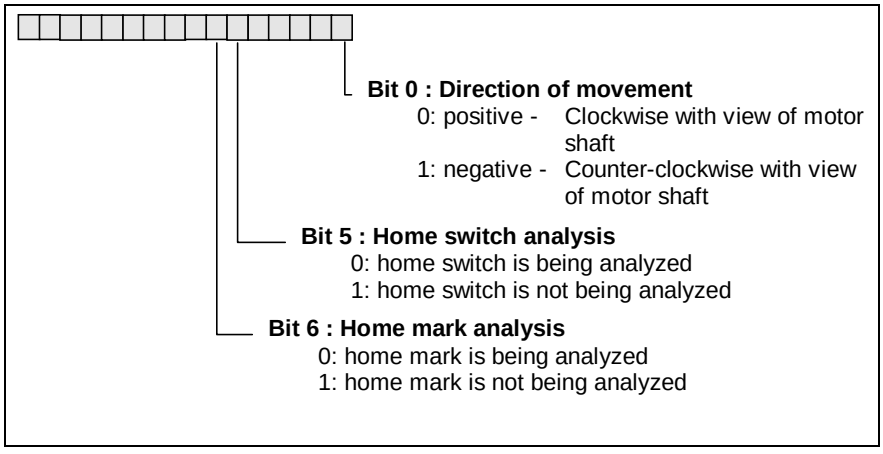

Bit 0 : Direction of movement
0: positive - Clockwise with view of motor shaft
1: negative - Counter-clockwise with view of motor shaft
Bit 5 : Home switch analysis
0: home switch is being analyzed
1: home switch is not being analyzed
Bit 6 : Home mark analysis
0: home mark is being analyzed
1: home mark is not being analyzed

Figure 2-13: S-0-0147, Homing Parameter

Note: Only the bits named here are supported by the product.

S-0-0147 - Attributes

Name in German:	Referenzfahr-Parameter		
Name in English:	Homing Parameter		
ID number:	S-0-0147	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	100 b

S-0-0148, C6 Drive Controlled Homing Procedure

Description:

When this command is set (NF,X2/13=1) and enabled (AH/Start, XA/3=1), the drive automatically switches into position control and accelerates using the **Homing acceleration, S-0-0041** to the **Homing velocity, S-0-0042.** Bit 0 in the **Position feedback value status, S-0-0403** will be reset to zero

The process for the homing procedure can be determined with the **Homing Parameter, S-0-0147**. After the command (drive is at stand still and position feedback value is related to the homing position) has been properly executed, the drive sets bit 0=1 in the **Position feedback value status, S-0-0403** parameter.

The position feedback value status parameter corresponds to the output "In reference ".

see also Function description: "Initiating a command"

S-0-0148 - Attributes

Name in German:	C6 Kommando Antriebsgeführtes Referenzieren		
Name in English:	C6 Drive controlled homing procedure command		
ID number:	S-0-0148	**Editability:**	P4
Function:	Command	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/11 b	**Default value:**	--

S-0-0150, Reference Offset 1

Description:

This parameter describes the distance between the Position feedback reference mark 1 and the **Reference distance 1, S-0-0052**.

At the end of the coming drive controlled homing procedure, the drive will position itself at the point equal to the Reference distance 1+ Reference offset 1 .

S-0-0150 - Attributes

Name in German:	Referenzmaß Offset 1		
Name in English:	Reference offset 1		
ID number:	S-0-0150	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	S-0-0076/S-0-0076	**Default value:**	+0.00 Deg

S-0-0159, Monitoring Window

Description:

The monitoring window makes it possible to set the maximum tolerable deviation between the measured position and the calculated position feedback value. If the position exceeds crosses into the monitoring window, the drive will set the error **F228, Excessive control deviation** in class 1 diagnostics.

The largest deviation that occurs will be stored in parameter **P-0-0098, Maximum model deviation**.

S-0-0159 - Attributes

Name in German:	Überwachungsfenster		
Name in English:	Monitoring Window		
ID number:	S-0-0159	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0076	**Default value:**	+30.00 Deg.

S-0-0160, Acceleration Data Scaling Type

Description:

Various scaling types can be set as described be;pw for the acceleration data in the drive as defined by the bit values of this parameter .

Structure of the parameter:

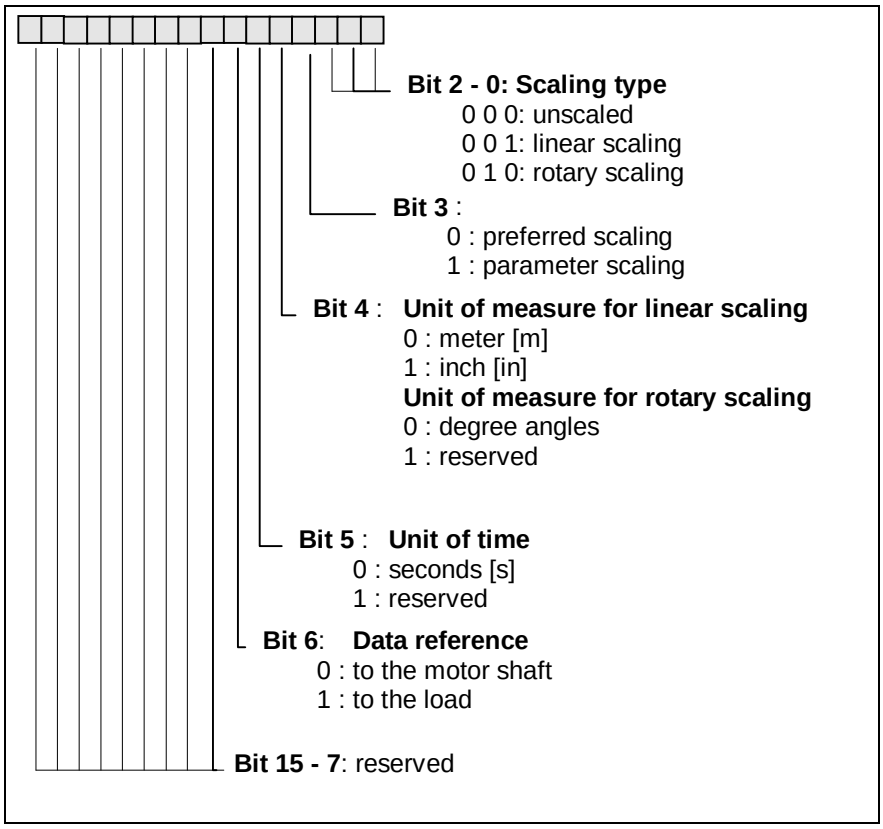

Bit 2 - 0: Scaling type
0 0 0: unscaled
0 0 1: linear scaling
0 1 0: rotary scaling
Bit 3 :
0 : preferred scaling
1 : parameter scaling
Bit 4 : Unit of measure for linear scaling
0 : meter [m]
1 : inch [in]
Unit of measure for rotary scaling
0 : degree angles
1 : reserved
Bit 5 : Unit of time
0 : seconds [s]
1 : reserved
Bit 6: Data reference
0 : to the motor shaft
1 : to the load
Bit 15 - 7: reserved

Figure 2-14: S-0-0160, Acceleration Data Scaling Type

Note: Only the bits named here are supported by the product.

Notes:

1) Same as S-0-0044, Note 1

2) Same as S-0-0044, Note 2

3) Example: Acceleration data scaling

Suppose that loadside, linear scaling as desired with acceleration units in M/s2. The Parameter 1 scaling/mechanical system dialog in DriveTop will set the preferred acceleration data scaling options on the drive as follows:

Parameter	Value
S-0-0159, Acceleration data scaling type	1001001
Bit 2-0 001 linear scaling	
Bit 3: 1 (Preferred) parameter scaling	
Bit 4: 0 Dimensional unit in meters (m)	
Bit 5: 0 Time unit in seconds (s)	
Bit 6: 1 Data referenced at load	

S-0-0161, Acceleration data scaling factor 1

S-0-0162, Acceleration data scaling exponent -6

Now suppose that the decimal value +1234567 is stored in the relavent acceleration data register. The datum value will be interpreted and displayed as:

or $+1234.567X10^{-3}$ mm/s^2

or

as the value would be displayed in the IDN lists, +1234.467 mm/s2 with respect to the load. Note that the least significant decimal value is determined by the scaling exponent, in this exaple, as 10^{-6} m/s^2 or 10^{-3} mm/s^2

S-0-0160 - Attributes

Name in German:	Wichtungsart für Beschleunigungsdaten		
Name in English:	Acceleration data scaling type		
ID number:	S-0-0160	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	1010 b

S-0-0161, Acceleration Data Scaling Factor

Description:

If parameter scaling is set in **S-0-0160, Acceleration data scaling type** the scaling factor for all acceleration data in the drive will be determined in this parameter.

Structure of the parameter:

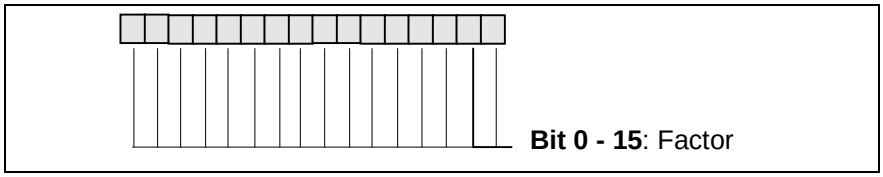


Figure 2-15: S-0-0161, Scaling Factor for Acceleration

S-0-0161 - Attributes

Name in German:	Wichtungs-Faktor für Beschleunigungsdaten		
Name in English:	Acceleration data scaling factor		
ID number:	S-0-0161	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/65535	**Default value:**	1

S-0-0162, Acceleration Data Scaling Exponent

Description:

If parameter scaling is set in **S-0-0160, Acceleration data scaling type** the scaling exponent for all acceleration data in the drive will be determined in this parameter.

Structure of the parameter:

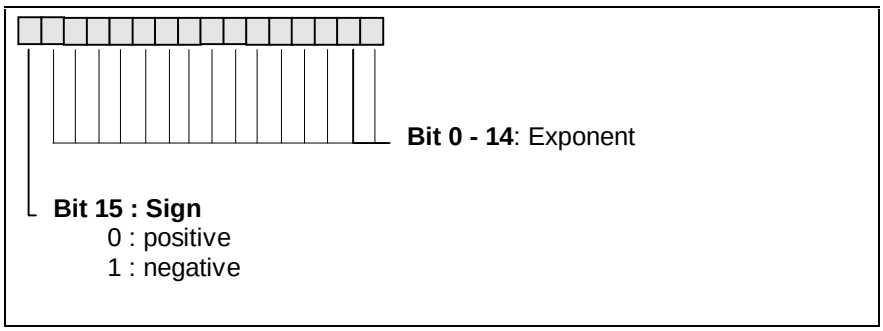


Figure 2-16: Scaling Exponent for Acceleration Data

S-0-0162 - Attributes

Name in German:	Wichtungs-Exponent für Beschleunigungsdaten		
Name in English:	Acceleration data scaling exponent		
ID number:	S-0-0162	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	AT
Input value min / max:	32/32	**Default value:**	-3

S-0-0182, Manufacturer Class 3 Diagnostics

Description:

Different messages regarding operating status will be stored here every 8ms. If the status of a message were to change, this would not be signalled by an editing bit.

Structure of the parameter:

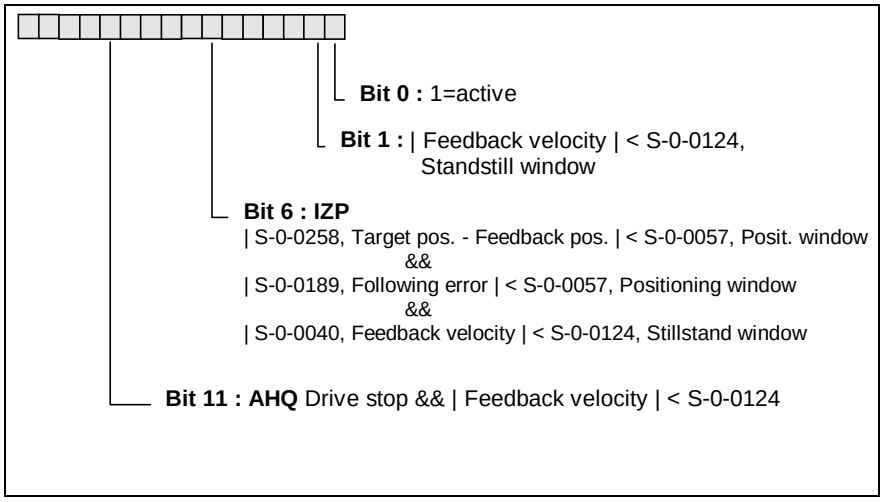

Bit 0 : 1=active
Bit 1 : | Feedback velocity | < S-0-0124, Standstill window
Bit 6 : IZP
| S-0-0258, Target pos. - Feedback pos. | < S-0-0057, Posit. window
&&
| S-0-0189, Following error | < S-0-0057, Positioning window
&&
| S-0-0040, Feedback velocity | < S-0-0124, Stillstand window
Bit 11 : AHQ Drive stop && | Feedback velocity | < S-0-0124

Figure 2-17: S-0-0182, Manufacturer Class 3 Diagnostics

Note: Only the bits named here are supported by the product.

S-0-0182 - Attributes

Name in German:	Hersteller-Zustandsklasse-3		
Name in English:	Manufacturer Class 3 Diagnostics		
ID number:	S-0-0182	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	AT
Input value min / max:	--/--	**Default value:**	--

S-0-0192, IDN-List of Backup Operation Data

Description:

The ID numbers for all of the operating data that must be loaded in the drive for proper operation are backed up in the IDN list. Customarily these are the parameters that are buffered in the parameter E^2Prom.

The control and to a file Drive Top use this IDN list to create a backup copy of the drive parameters.

S-0-0192 - Attributes

Name in German:	IDN-Liste der zu sichernden Betriebsdaten		
Name in English:	IDN-List of backup operation data		
ID number:	S-0-0192	**Editability:**	no
Function:	Parameter	**Memory:**	fixed
Data length:	2Byte variable	**validity check:**	no
Format:	IDN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0193, Positioning Jerk

Description:

The positioning jerk limits the acceleration change with respect to time in the operating mode with "Drive internal interpolation".

- Referencing
- Jogging

Note: At 0 value, the jerk filter is shut off.

S-0-0193 - Attributes

Name in German:	Positionier-Ruck		
Name in English:	Positioning jerk		
ID number:	S-0-0193	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	S-0-0160/S-0-0160	**combination check:**	no
Posit. after the dec.:	S-0-0160	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0160	**Default value:**	0

S-0-0258, Target Position

Description:

The target position will be assigned to the drive as a command value by the controller in the "Drive internal interpolation" operating mode. The drive travels toward the "target position" with due regard to **S-0-0259, Positioning velocity**, the **S-0-0260, Positioning acceleration** and **S-0-0193, Positioning jerk**.

In the "Position control with positioning interface" operating mode, the target position of the current Positioning Position block will be copied to parameter **S-0-0258, Positioning target position**.

S-0-0258 - Attributes

Name in German:	Zielposition		
Name in English:	Target Position		
ID number:	S-0-0258	**Editability:**	P234
Function:	Parameter	**Memory:**	no
Data length:	4 Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	MDT
Input value min / max:	S-0-0076/S-0-0076	**Default value:**	--

S-0-0259, Positioning Velocity

Description:

In the "Drive internal interpolation" operating mode, the **S-0-0258, T**arget position** is approached with the positioning velocity. In the "Block controlled " operating mode, the positioning velocity of the current Positioning block is copied to the parameter **"S-0-0259, Positioning velocity"**.

S-0-0259 - Attributes

Name in German:	Positionier-Geschwindigkeit		
Name in English:	Positioning velocity		
ID number:	S-0-0259	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_M?V	**Extreme value check:**	yes
Unit German/English:	S-0-0044/S-0-0044	**combination check:**	no
Posit. after the dec.:	S-0-0044	**cyc. transmittable:**	MDT
Input value min / max:	S-0-0044/S-0-0044	**Default value:**	+1.0000 Rpm

S-0-0260, Positioning Acceleration

Description:

"Positioning acceleration" is used in the "Drive internal interpolation" operating mode to accelerate up to the **S-0-0259, Positioning velocity** .

In the "Block controlled operation" operating mode, the positioning acceleration of the current Positioning blocl is copied to the parameter **S-0-0260, Positioning acceleration**.

S-0-0260 - Attributes

Name in German:	Positioning acceleration		
Name in English:	Positioning acceleration		
ID number:	S-0-0260	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_M?V	**Extreme value check:**	yes
Unit German/English:	S-0-0160/S-0-0160	**combination check:**	no
Posit. after the dec.:	S-0-0160	**cyc. transmittable:**	MDT
Input value min / max:	S-0-0160/S-0-0160	**Default value:**	+1000.000rad/s²

S-0-0262, Command Basic Load

Description:

When this command is set and enabled the default parameters in the motor for current, velocity and position control loop settings will be loaded and activated. The default parameters are **not** optimized for all applications. They establish a stable control loop status.

⇒ When this command is executed, parameters that have already been optimized may be overwritten.

see also Function description: "Initiating a command"

S-0-0262 - Attributes

Name in German:	Kommando Urladen		
Name in English:	Command Basic Load		
ID number:	S-0-0262	**Editability:**	P234
Function:	Command	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/11 b	**Default value:**	--

S-0-0269, Parameter Buffer Mode

Description:

The "Parameter buffer mode" is used to determine whether the data transmitted through the serial interface will be stored temporarily (in RAM) or permanently (in EEPROM).

1: Data will not be stored permanently.

0: Data will be stored permanently.

After the control voltage supply has been switched on, the drive will initialize bit 0 to "0". To activate temporary storage mode bit 0 must be forced to “1”.

S-0-0269 - Attributes

Name in German:	Speicherungsmode		
Name in English:	Parameter buffer mode		
ID number:	S-0-0269	**Editability:**	P234
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	DEC_0V	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/1	**Default value:**	0

For applications that wirte cylic or frequenct updates Note: to the drive parameter data, tempory storage made should be activated by the initialization procedure in the machine control. This mode insures that the write cycle life of the Eeprom is not exceeded.

S-0-0277, Position Feedback 1 Type Parameter

Description:

This parameter is used to determine the significant properties of the motor feedback (Position feedback 1).

For DKC the parameter will be set automatically by the drive.

Structure of the parameter:

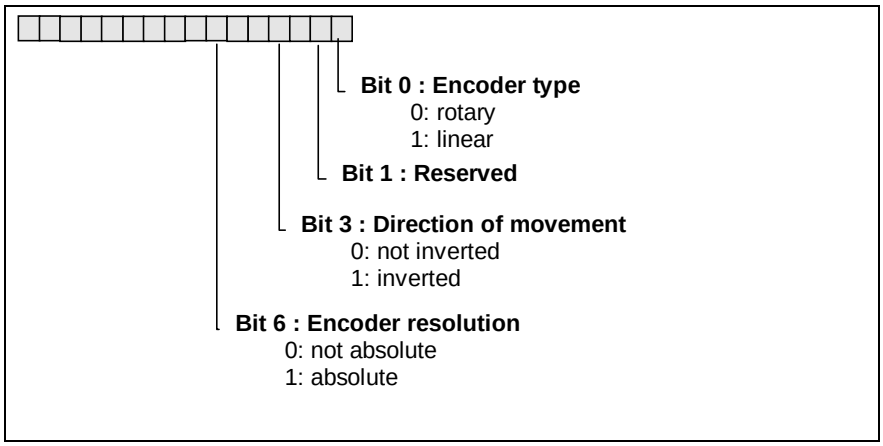


Figure 2-18: S-0-0277, Position Feedback Parameter

Remark:

For absolute measurment systems with data memory, bit 6 will be set automatically.

When MDD and MKD motors are used, bit 0, 1, and 3 will be set and write protected by the drive.

Note: Only the bits named here are supported by the product

S-0-0277 - Attributes

Name in German:	Lagegeberart-Parameter 1		
Name in English:	Position feedback 1 type parameter		
ID number:	S-0-0277	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	0b

S-0-0331, Status Feedback = 0

Description:

This parameter sets an IDN for the "status feedback = 0" which can be used to allocate it to a real-time status bit (IDN 0-0305). The "status feedback = 0" is defined as a bit in class -3 diagnostics (IDN 0-0013) and is set when the velocity feedback value is found within the standstill window (IDN 00124).

Only bit 0 is defined in the operating data

The output "In motion" corresponds to this bit.

S-0-0331 - Attributes

Name in German:	Meldung nist = 0		
Name in English:	Status "feedback = 0"		
ID number:	S-0-0331	**Editability:**	no
Function:	Parameter	**Memory:**	--
Data length:	2 Byte	**validity check:**	--
Format:	binary	**Extreme value check:**	--
Unit German/English:	--/--	**combination check:**	--
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0400, Home Switch

Description:

This IDN is assigned to the home switch status (external signal) with this parameter.

Structure of the parameter

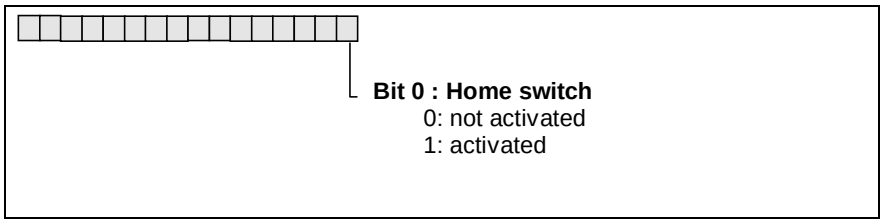


Figure 2-19: S-0-0400, Home Switch

S-0-0400 - Attributes

Name in German:	Referenzpunktschalter		
Name in English:	Home switch		
ID number:	S-0-0400	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

S-0-0403, Position Feedback Value Status

Description:

Bit 0 for this parameter will be set by the drive if the position feedback value, whose origin was selected in bit 3 from **S-0-0147, Homing Parameter** , is firmly referenced to the machine zero point.

If the commands **S-0-0148, Drive controlled homing procedure,** or **P-0-0012, Set absolute distance** are performed, the bit will be reset when they are started and then set 1 again once the command has been successfully completed.

The bit status position feedback value corresponds to the output "In reference".

Structure of the parameter:

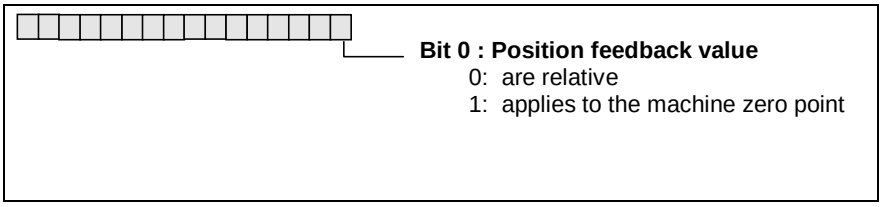


Figure 2-20: S-0-0403, Position Feedback Value Status

S-0-0403 - Attributes

Name in German:	Status Lageistwerte		
Name in English:	Position feedback value status		
ID number:	S-0-0403	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

Notes

3 Specific Product Parameters

P 0 0001 Diagnostic Message Number

Description:

The diagnostic message number will be stored in parameter P-0-0001, "Diagnostic message number" as well as the visual seven segment display.The controls will make it possible so that specific diagnostics with the aid of the diagnostic message number can be generated(for example diagnostics in additional languages which are not stored in the drive). The machine control may utilize the diagnostic number to generate its own specfic set of diagnostic messages.

Example:

Diagnostic Message:	„F822 Motor Feedback error:"Signals too small " in paramater S-0-0095
Seven Segment Display:	variable „F8" <=> „22"
Diagnostic message number:	„F822(hex)" in paramter P-0-0001

P-0-0001 - Attributes

Name in German:	Diagnose Nummer		
Name in English:	Diagnostic Message Number		
ID number:	P-0-0001	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2Byte	**validity check:**	no
Format:	HEX	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-0004, Smoothing Time Constant

Description:

This time contstant parameter functions to influence the output of the velocity loop regulator in order to suppress quantization effects and limit the bandwidth of the velocity loop.

see also Function description: "Setting the velocity loop"

P-0-0004 - Attributes

Name in German:	Glättungszeitkonstante		
Name in English:	Smoothing Time Constant		
ID number:	P-0-0004	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	us/us	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	500/65535	**Default value:**	500 ms

P-0-0005, Language Selection

Description:

Within the drive controller there are parameter names, units and diagnostic/warning messages collectively stored in more than one language. This parameter will establish in which language the text should be given.

- 0 :German
- 1 :English

Additional languages are in preparation

P-0-0005 - Attributes

Name in German:	Sprachumschaltung		
Name in English:	Language Selection		
ID number:	P-0-0005	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/1	**Default value:**	--

P-0-0006, Overload Factor

Description:

The "overload factor" parameter value influences and determines the values for the torque releated drive parameters Mmax, MKB and the short duration torque percent duty cycle, ED.

Increasing the overload factor corresponds to a reduction of the parameter values for:

- The percent duty cycle ED
- the maximum peak torque Mmax

Increasing the overload factor corresponds to an increase in the short duration torque Mkb.

$$\ddot{U}F \approx \frac{M_{KB}}{M_{dN}} \cdot 100\%$$

üF	=	P-0-00061
MKB	=	Short period operational torque in Nm
MdN	=	Stand still torque in Nm

Figure 3-1: Overload factor

P-0-0006 Attributes

Name in German:	überlastfaktor		
Name in English:	Overload factor		
ID number:	P-0-0006	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E2prom
Data length:	2Byte	**validity check:**	Phase 3
Format:	DEC_0V	**Extreme value check:**	yes
Unit German/English:	%/%	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/500	**Default value:**	100 %

P-0-0009, Error Message Number

Description:

If an error ocurs during cyclic operation, then it will be diagnosed and displayed on a seven segment display.

At the same time a bit will be set in the **S-0-0011,** status class and the change bit for this status class in the drive status word S-0-0135. The machine control can determine the queued eror condition passed to the drives diagnostic display by reading this parameter, which contains only the three least significant decimals of the diagnostics message number, P-0-0001, (in range 201...899) and determine a specific error reaction or custom diagnostic text message .

If there is not an error then the value of this parameter is 0.

Example:

Queued error:	F822, "Motor feedback error signal amplitude error "
P-0-0009, error number	822

P-0-0009 - Attributes

Name in German:	Fehler Nummer		
Name in English:	Error Message Number		
ID number:	P-0-0009	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2Byte	**validity check:**	no
Format:	HEX	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-0012, Command 'Set Absolute Measurement'

Description:

With the startup of an absolute measuring system, the drive will indicate a position feedback value that is arbitrary and not referenced to the machine zero point .The value of the parameter **S-0-0403, Position feedback value status** will be 0.

Through the command "Set absolute measurement ", the position feedback of this measuring system will be set on the desired value. After the end of the command "Set absolute measurement ", the position feedback of the measurement supplied encoder bares a defined reference to the machine zero point.

Through the buffering of all the required data of the absolute measuring system in the feedback data memory (eg parameter data memory), all information is available after re-booting the system. The position feedback permanently retains its reference to the machine zero point. All the required data for the absolute measuring sytem is permanently either in the feedback position data memory or in the drive parameter data memory, and is available after rebooting the drive system.

The parameter P-0-012 operates for the execution of this function.

see also Function description: "Disengagement of a command"

P-0-0012 - Attributes

Name in German:	Kommando Absolutmaß setzen		
Name in English:	Command 'Set Absolute Measurement'		
ID number:	P-0-0012	**Editability:**	P4
Function:	Command	**Memory:**	no
Data length:	2Byte	**validity check:**	no
Format:	BIN	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/11 b	**Default value:**	--

P-0-0013, Command value mode for modulo format

Description:

The interpretation of the position command values like **S-0-0047, Position command value** and**S-0-0258**, T**arget position** with a modulo function actuve is dependent on the setting of the mode.

For the setting of the mode, the parameter P-0-0013 Command value mode for modulo format exists.

This parameter is functional only when **S-0-0076, scaling type Position data** had been activated for modulo format.

The folowing valued can be parameterized:

P-0-0013:	Meaning:
0 :	shortest path
1	Positive direction
2	Negative direction

Figure 3-2: parameter P-0-0013

WARNING ⇒ With the step motor interface only 0 = "shortest path" can be set

P-0-0013 - Attributes

Name in German:	Sollwertmodus im Moduloformat		
Name in English:	Command value mode for modulo format		
ID number:	P-0-0013	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/2	**Default value:**	0

P-0-0017, Parameters Group List

Description:

The parameter no longer has any significance for the firmware to the version DKC01.1-ASE-02VRS.

P-0-0017 - Attributes

Name in German:	Parameter Gruppierungsliste		
Name in English:	Parameter group list		
ID number:	P-0-001	**Editability:**	no
Function:	Parameter	**Memory:**	fixed
Data length:	1 byte variable	**validity check:**	no
Format:	HEX	**Extreme value check:**	no
Unit German/English:	-/-	**combination check:**	no
Posit. after the dec.:	-	**cyc. transmittable:**	no
Input value min / max:	-/-	**Default value:**	no

P-0-0018, Numbers of Motor Pole Pairs /Pole Pair Distance

Description:

With rotating motors, the number of pole pairs per motor revolution will be given .

This value is stored within the motor feedback data memory and must not be changed .

P-0-0018 - Attributes

Name in German:	Polpaarzahl/Polpaarweite		
Name in English:	Number of Motor Pole Paris distance		
ID number:	P-0-0018	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC-OV	**Extreme value check:**	no
Unit German/English:	Polpaare bzw. /Pair of poles or mm (dependent on P-0-4014, Motor type)		
combination check:	no		
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/4	**Default value:**	--

P-0-0019, Position Start Value

Description:

The position start value serves the non-absolute measuring system through the paramaterization of a defined initialization value for the Position feedback value 1 S-0-0051.

The drive tests if the Position start value has been specified in communication phases 2 or 3 during the initialization of the position feedback. Only then will the position feedback value 1 be set to this value.The intial position value will function only with a single-turn-feedback .

P-0-0019 - Attributes

Name in German:	Lageanfangswert		
Name in English:	Position start value		
ID number:	P-0-0019	**Editability:**	P23
Function:	Parameter	**Memory:**	no
Data length:	4Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	no
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	S-0-0076/S-0-0076	**Default value:**	--

P-0-0020, Reference Cam Shifting

Description:

P-0-0020 is also referred to as “Displacement of the Home Switch”. During drive controlled homing (S-0-0148), the home switch is evaluated by the drive. An optimal location exists from the relative position where the home switch signals to the marker pulse of the motor feedback. In order to assist in the adjustment (positiioning the mechanical cam) during the first start-up, the distance from the home switch cam to the optimal switch position is given in this parameter.

The value displayed is dependent on the selectedset position data scaling type **(S-0-0076, position data scaling type)** and is displayed in [units], [degree] or [inch].

P-0-0020 - Attributes

Name in German:	Verschiebung des Referznzknockens um..		
Name in English:	Reference cam shifting		
ID number:	P-0-0020	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	4Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	no
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	S-0-0076/S-0-0076	**Default value:**	--

P-0-0038, Signal Selection for Analog Output Channel 1

Description:

Two outputs make it possible to read internal drive operational signals and output variables as analog voltage signals. Through a oscilliscope connection to the analog outputs, these signals can be investigated.The maximum output voltage is + or - 10 volts with a definition of 8 bits. To select a specific signal, a predefined channel number is available. For the analog channel 1, the choice is indicated through the display of the channel selection number in the parameter P-0-0038.

The following predefined signals are available:

Number:	Signal choice:	Scaling:
0	No analog output	
1	Established torque power	10V = S-0-0110, Amplifier peak current
2	Velocity feedback actual value	P-0-0040
3	Velocity command value	P-0-0040
5	Position value 1	P-0-0042
7	Following error	P-0-0042
8	Sine signal of motor feedback	1:1
9	Cosine signal of motor feedback	1:1
23	Torque producing current actual value	10V = S-0-0110, Amplifier peak current
24	Magnetization current	10V = S-0-0110,Amplifier peak current
40	Bleeder load	10V= Maximum bleeder energy 100% continuous bleeder load

Figure 3-3: Possible analog outputs

The following scaling parameters should be considered:

- **P-0-0040 Scaling for velocity data on analog channel 1**
- **P-0-0042 Scaling for position data on analog channel 1**

P-0-0038 - Attributes

Name in German:	Signal-Auswahl Analogkanal 1		
Name in English:	Signal Selection for Analog Output Channel 1		
ID number:	P-0-0038	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4Byte	**validity check:**	Phase3
Format:	HEX	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	1

P-0-0039, Signal Selection for Analog Output Channel 2

Description:

Two output channels make it is possible to read internal drive operational signals and output variables as analog voltage signals. Through an oscilliscope connection to the analog outputs, these signals can be investigated. The maximum output voltage is + or - 10 volts with a definition of 8 bits. To select a specific signal, a predefined channel number is available. For the analog channel 2, the choice is indicated through the display of the channel number in parameter P-0-0039.

The following predefined signals are available:

Number:	Signal choice:	Scaling:
0	No analog output	
1	Torque producing current command	10V = S-0-0110 amplifier peak current
2	Velocity feedback actual value	P-0-0040
3	Velocity Command value	P-0-0040
5	Position actual value 1	P-0-0042
7	Following error	P-0-0042
8	Sine signal of the motor feedback	1:1
9	Cosine signal of the motor l feedback	1:1
23	Tonrque producing current actual value	10V = S-0-0110 Amplifier peak current
24	Magnetization current	10V = S-0-0110 Amplifier peak current
40	Bleeder load	10V= 100% continous bleeder load

Figure 3-4: predefined signals

The following scaling parameters scaling should be considered:

- **P-0-0041 Scaling for velocity data on analog channel 2**
- **P-0-0043 Scaling for position data on analog channel 2**

P-0-0039 - Attributes

Name in German:	Signal-Auswahl Analogkanal 2		
Name in English:	Signal Selection for Analog Output Channel 2		
ID number:	P-0-0039	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4Byte	**validity check:**	no
Format:	HEX	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	2

P-0-0040, Scaling of Velocity Data on .Analog Output Channel 1

Description:

With the selection numbers 2 and 3 in the parameter **P-0-0038, Signal selection for analog output channel 1**, the scaling of velocity data evaluated will be established with the parameter P-0-0040.

The unit of Rpm/10V will always be in reference to the motor.

P-0-0040 - Attributes

Name in German:	Wichtg. von Geschwindigk. Analogausgabe Kanal 1		
Name in English:	Scaling of velocity data analog output Channel 1		
ID number:	P-0-0040	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC-OV	**Extreme value check:**	yes
Unit German/English:	Upm/10V /Rpm/10V/Rpm/10V		
combination check:	no		
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/65535	**Default value:**	3000 Rpm/10V

P-0-0041, Scaling of Velocity.Analog Output-Channel 2

Description:

With the selections in the parameter **P-0-039, signal select analog output channel 1**, the scaling will be established with the parameter P-0-0041.

Thereby a unit of Upm/10V will always be established on the motor An eventual existing operational translation will not be considered.

P-0-0041 - Attributes

Name in German:	Wichtg. von Geschwindigk. Analogausgabe Kanal2		
Name in English:	Scaling factor for velocity data Channel 2		
ID number:	P-0-0041	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	Upm/10V/Rpm/10V	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/65535	**Default value:**	3000

P-0-0042, Scaling for Position Data on Analog Output Channel 1

Description:

With the selection numbers 5 and 7 in parameter **P-0-0038, Signal selection for analog output channel 1**, the scaling of the position data will be established in parameter P-0-0042.

The unit of Deg/10V is given in reference to the motor shaft.

P-0-0042 - Attributes

Name in German:	Wichtg. von Lagedaten Analogausgabe Kanal1		
Name in English:	Scaling for position data on Analog output Channel 1		
ID number:	P-0-0042	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	agrad/10V/Deg/10V	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	0,1/6553,5	**Default value:**	360,0

P-0-0043, Scaling for Position Data on Analog Output Channel 2

Description:

With the selection in parameter **P-0-0039, Signal selection for analog output channel 2**, the scaling of the position data will be established in parameter P-0-0043.

The unit of Deg/10V is given in reference to the motor shaft.

P-0-0043 - Attributes

Name in German:	Wichtg. von Lagedaten Analogausgabe Kanal2		
Name in English:	Scaling for position data on analog output Channel 2		
ID number:	P-0-0043	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	Grad/10V/Deg/10V	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	0,1/6553,5	**Default value:**	360.0

P-0-0051, Torque Constant

Description:

The torque constant determines what driving torque of the motoris given by a specified motor current.
With a synchronous motor, this value is exclusive of the motor construction.

The value is stored in the motor feedback memory and cannot be changed.

$$MA[Nm;N] = (P-0-0051)\cdot(P-0-0080)$$

MA:	Drivel torque
P-0-0051	Torque constanst [N/A]
S-0-0080	Torque-power-command value [a

Formula 3-5: Drive torque

P-0-0051 - Attributes

Name in German:	Drehmoment/Konstante		
Name in English:	Torque-Constant		
ID number:	P-0-0051	**Editability:**	P3
Function:	Parameter	**Memory:**	Feedb.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	Nm/A/Nm/A	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0/1000	**Default value:**	--

P-0-0090, Travel Limit Parameter

Description:

The activation of the travel limit switches reaches in the parameter P-0-0090. In addition to this, one can invert the polarity of the signal input.

The drive response to a travel limit can be selected by testing it as either an error or as a warning.

Structure of the parameter:

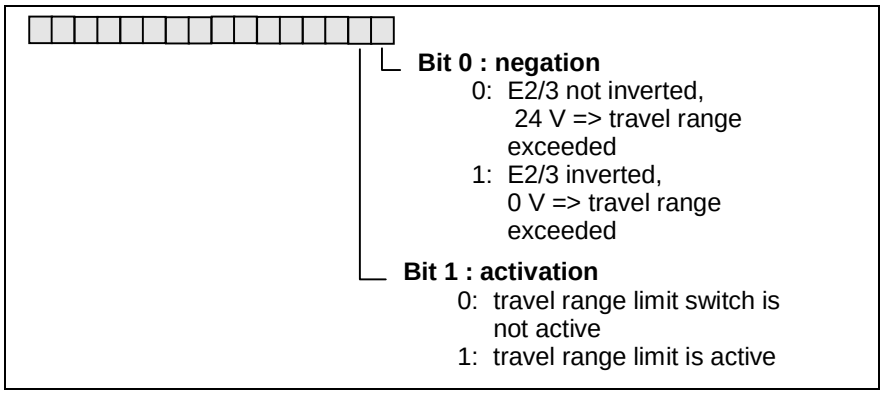

Bit 0 : negation
0: E2/3 not inverted, 24 V => travel range exceeded
1: E2/3 inverted, 0 V => travel range exceeded
Bit 1 : activation
0: travel range limit switch is not active
1: travel range limit is active

Figure 3-6: P-0-0090, Travel Limit Parameter

P-0-0090 - Attributes

Name in German:	Fahrbereichgrenzschalter-Parameter		
Name in English:	Travel limit parameter		
ID number:	P-0-0090	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	BIN	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-0097, AbsoluteEncoderMonitoring Window

Description:

With the use of a absolute encoder, the drive memory data and actual feedback position value on the axis will be compared during the command execution of window 3 -> 4.

If the difference is larger than what is parameterized in parameter P-0-0097, the error message **F276, Absolute encoder error** will be given**. This error indicates that the absolute position of the axis has changed since the last time it was taken out of operating mode.**

As a default value, one can typically use 30 degrees with respect to the motor shaft in the case that the axis contains a holding (ie it is self-locking) brake.

P-0-0097 - Attributes

Name in German:	Absolutgeber-Überwachungsfenster		
Name in English:	AbsoluteEncoderMonitoring Window		
ID number:	P-0-0097	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0076	**Default value:**	30,00 Deg

P-0-0098, Maximum Model Deviation

Description:

Under the maximum model deviation, one can determine the maximum deviation between the real position feedback and one from a drive calculated position feedback module.

The parameter can be read from the C**ontrol window** by the user as a help for the parameterization of **S-0-0159**.

Two cases must be distinguished for understanding and utilizing the position feedback module.

- **position control allowing following error**

In this operating mode, the controlled system with the help of a model will be simulated.

The maximum deviation between the calculated position feedback module and the real position feedack will be stored in parameter P-0-0098.

The model of the controll system in this case represents a first order feedback system which is only dependent on the Kv-factor of the position controller.

- **position control without following error**

In this operating type, the position command will be compared with the position feedback.The maximum deviation which occurs will be stored in P-0-0098.

A model for the controled system is not be necessary in this case.

Note: The parameter is only descriptive so that one can, for example, reset it back to 0.

P-0-0098 - Attributes

Name in German:	max.		
Name in English:	Maximum Model Deviation		
ID number:	P-0-0098	**Editability:**	P234
Function:	Parameter	**Memory:**	no
Data length:	4Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	0/S-0-0076	**Default value:**	--

P-0-0119, Error Reaction Best Possible braking

Description:

This parameter specifies the type of breaking to standstill of the drive following :

- non-fatal error
- interface error
- switching off of the controller enable signal

P-0-0119:	Reaction type:
0	Velocity command is set to zero value , that means the motor will be braked under control of the bipolar torque limit parameter value. The braking **time** may amount to a maximum of 500ms. 100 milliseconds before the operation of the brake time, the holding brake will be activated. Should the velocity already have fallen below the value of "S-0-0124 Stand still window", the holding brake will be immediately activated . After 500ms, the motor is torque free .
1	Switch to torque free state

Figure 3-7: Reaction types

The controller enable can be closed again, at the earliest, after the operation of the error reaction. The drive will ignor the controller enable input until the error reaction operation of the drive is completed.

P-0-0119 - Attributes

Name in German:	Bestmögliche Stillsetzung		
Name in English:	Error Reaction best possible braking		
ID number:	P-0-0119	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/1	**Default value:**	0

P-0-0123, Absolute Encoder Buffer

Description:

In this parameter all the data will be secured which is necessary for the initializing of the position by the absolute encoder.

P-0-0123 - Attributes

Name in German:	Absolutgeber-Buffer		
Name in English:	Absolute encoder buffer		
ID number:	P-0-0123	**Editability:**	no
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2Byte variable	**validity check:**	no
Format:	HEX	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-0500, Velocity Command Voltage for Max. Motor Speed

Description:

Parameter for setting the scale factor of the analog velocity command value. Along with the parameter P-0-501, the scaling for the velocity command value is determined :

P-0-0501, Motor speed for maximum velocity command voltage [Rpm] /

P-0-0500, Velocity command voltage for Max. motor speed [V]

$$validity\ \ of\ \ the\ \ analog\ \ velocity\ \ command\ \ value = \frac{P-0-0501}{P-0-0500}$$

Figure 3-8:Scale factor of the analog velocity command value

P-0-0500 - Attributes

Name in German:	Sollwert-Vorgabe für gewünschte Drehzahl		
Name in English:	Velocity command voltage for max. motor speed		
ID number:	P-0-0500	**Editability:**	P2
Function:	Parameter	**Memory:**	Param. E²Prom
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	V/V	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	1/10,0	**Default value:**	10,0 V

P-0-0501, Motor Speed for Maximum Velocity Command Voltage

Description:

Parameter for setting the scale factor of the analog velocity command value. Along with the parameter P-0-501, the scaling for the velocity command value is determined :

P-0-0501, motor speed for maximum velocity command voltage [Rpm] /

P-0-0500, Velocity command voltage for Max. motor speed [V]

P-0-0501 - Attributes

Name in German:	Drehzahl bei gewählter Sollwert-Vorgabe		
Name in English:	Motor speed for max. velocity command		
ID number:	P-0-501	**Editability:**	no
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	Upm/rpm	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/30000	**Default value:**	3000

P-0-0502, Line Count for the Incremental Encoder

Description:

If the actual position value output is selected for incremental encoder emulation, then the line count of the incremental encoder must be set.

P-0-0-502 - Attributes

Name in German:	Strichzahl des Inkrementalgebers		
Name in English:	Line count for the incremental encoder		
ID number:	P-0-0502	**Editability:**	no
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	4 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	1/65536	**Default value:**	1250

P-0-0503, Reference Pulse Offset

Description:

With this parameter, the position of the reference pulse of the emulated incremental encoder output can be shifted.

P-0-0503 - Attributes

Name in German:	Referenzimpuls-Offset		
Name in English:	Reference pulse offset		
ID number:	P-0-0503	**Editability:**	no
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	Grad/Degree	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	0/359,9	**Default value:**	0

P-0-0504, Command Filter Smoothing Time Constant

Description:

The analog velocity command value is filtered according to the recorded time constant.

P-0-0504 - Attributes

Name in German:	Sollwertfilter-Glättungszeitkonstante		
Name in English:	Command filter smoothing time constant		
ID number:	P-0-0504	**Editability:**	no
Function:	Parameter	**Memory:**	Param. E²Prom
Data length:	4 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	ms/ms	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0,5/1000,00	**Default value:**	5,00

P-0-0508, Commutation Offset

Description:

This parameter, with synchronous motors, gives the offset between raw value of the rotational feedback and the resulting absolute electrical angle between the stator current vector and the rotor flux vector.

The commutator offset is stored in the motor feedback data memory and does not need to be entered .

P-0-0508 - Attributes

Name in German:	Kommutierungs-Offset		
Name in English:	Commutation -Offset		
ID number:	P-0-0508	**Editability:**	no
Function:	Parameter		
Memory:	Param.E²prom, Feedb. E²Prom		
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/10000	**Default value:**	--

P-0-0509, Slot Angle

Description:

The utilization of this parameter is not currently available.

P-0-0509 - Attributes

Name in German:	Paßfedernutwinkel		
Name in English:	SlotAngle		
ID number:	P-0-0509	**Editability:**	no
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_MV	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/3599	**Default value:**	--

P-0-0510, Moment of Inertia of the Rotor

Description:

This parameter gives the moment of inertia of the rotor without a load and is stored in the feedback with motors with feedback memory.

P-0-0510 - Attributes

Name in German:	Rotorträgheitsmoment		
Name in English:	Moment of inertia of the rotor		
ID number:	P-0-0510	**Editability:**	no
Function:	Parameter		
Memory:	Param.E²prom, Feedb. E²Prom		
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	kgm²/kgm²	**combination check:**	no
Posit. after the dec.:	5	**cyc. transmittable:**	no
Input value min / max:	0/1,00000	**Default value:**	--

P-0-0511, Brake Current

Description:

The parameter is not operational with DKC01/DKC1.1.

P-0-0511 - Attributes

Name in German:	Haltebremsenstrom		
Name in English:	Break Current		
ID number:	P-0-0511	**Editability:**	no
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	0/500,000	**Default value:**	0.000A

P-0-0512, Default Position Loop Kv-factor

Description:

Default value for the position loop proportional gain . This parameter is determined during the manufacturing stage and cannot be changed. The “Load default parameters” command will copy the value of this parameter to the parameter S-0-0104, position loop Kv factor.

P-0-0512 - Attributes

Name in German:	Defaultwert für Lageregler Kv-Faktor		
Name in English:	Default position loop Kv-factor		
ID number:	P-0-0512	**Editability:**	no
Function:	Parameter	**Memory:**	Feedb. E²prom
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	1000/min/1000/min	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0,01/327,67	**Default value:**	1.00 1000/min

P-0-0513, Feedback Type

Description:

This value is available with all measuring systems with feedback data memory and diagramed next to the control analysis of important properties of the measuring system.The coding of the parameter is set by the drive dealer.

The parameter is not describeable and serves exclusively the information of the connected feedback.

With motors with single turn resolver, the value is = 0.

With motors with multi turn resolver, the value is = 16.

P-0-0513 - Attributes

Name in German:	Feedbacktyp		
Name in English:	Feedbacktype		
ID number:	P-0-0513	**Editability:**	no
Function:	Parameter	**Memory:**	Feedb.-E²prom
Data length:	2 Byte	**validity check:**	no
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/100	**Default value:**	--

P-0-0514, Absolute Encoder Offset

Description:

The parameter function for the initializing position of the absolute encoder.

P-0-0514 cannot be edited.

P-0-0514 - Attributes

Name in German:	Absolutgeber-Offset		
Name in English:	Absolut-Encoder-Offset		
ID number:	P-0-0514	**Editability:**	no
Function:	Parameter	**Memory:**	Feedb.-E²prom
Data length:	4 Byte	**validity check:**	no
Format:	HEX	**Extreme value check:**	no
Unit German/English:	Inkr./Inkr.	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-0515, Home(Reference) Position

Description:

Reference position for the SSI emulation.

Here the position in degrees will be placed on the motor which should be read after the „absolute measurement emulator setting" from the SSI emulator.

P-0-0515 - Attributes

Name in German:	Referenz Position / Offset		
Name in English:	Home (Reference) position		
ID number:	P-0-0515	**Editability:**	P2
Function:	Parameter		
Memory:	Parameter EEProm		
Data length:	4 Byte	**validity check:**	yes
Format:	DEC_MV	**Extreme value check:**	yes
Unit German/English:	Grad/Degree	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0/1474559,99	**Default value:**	0

P-0-0516, Feedback Interface

Description:

This parameter has no meaning with DKC

P-0-0516 - Attributes

Name in German:	Feedback-Interface		
Name in English:	Feedback interface		
ID number:	P-0-0516	**Editability:**	--
Function:	Parameter	**Memory:**	fixed
Data length:	2 Byte	**validity check:**	yes
Format:	binary	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	0/100	**Default value:**	0

P-0-0518, Amplifier Nominal Current-2

Description:

The parameter specifies the maximum nominal current of the amplifier with reduced peak current.

It specifies within the parameters **S-0-0110, amplifier peak current, S-0-0112, amplifier nominal current** and **P-0-0519, amplifier peak current-2**, the length of the peak current characteristics for the peak current limit of the amplifier.

The value is not editable because it is permanently programmed within the amplifier.

P-0-0518 - Attributes

Name in German:	Verstärker Nennstrom-2		
Name in English:	Amplifier Nominal Current-2		
ID number:	P-0-0518	**Editability:**	no
Function:	Parameter	**Memory:**	Verst.-E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	0,001/500	**Default value:**	--

P-0-0519, Amplifier Peak Current-2

Description:

The drive offers the possibility of a changed length of peak current characteristic with reduced amplifier peak current and is therefore defined as a increased amplifier length current.

The parameter P-0-0519 specifies a amplifier peak current for this case.

It serves for the determination of the functioning points on the length of the peak current characterisic.

The value of this parameter is not editable because it is permantently programmed in the amplifier.

P-0-0519 - Attributes

Name in German:	Verstärker Spitzenstrom-2		
Name in English:	Amplifier Peak Current-2		
ID number:	P-0-0519	**Editability:**	no
Function:	Parameter	**Memory:**	Verst.-E²prom
Data length:	4 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	0,001/500	**Default value:**	--

P-0-0520, Hardware Number

Description:

Parameter for identification of the hardware.

The parameter is determined during the manufacturing stage and cannot be changed.

S-0-0520 - Attributes

Name in German:	Hardware-Kennung		
Name in English:	Hardware-Number		
ID number:	P-0-0520	**Editability:**	not editable
Function:	Parameter		
Memory:	Amplifier EEProm		
Data length:	2 Byte	**validity check:**	no
Format:	decimal	**Extreme value check:**	no
Unit German/English:	none/none	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-0522, Absolute Encoder Count Direction

Description:

WIth this parameter, the operational direction of the absolute encoder emulation will be set.If the parameter =1 is set then the operation direction will be inverted.That means the SSI interface recieves a given position value for the rotation of the motor in clockwise/counterclockwise direction.With the change of the operational direction, the new command „absolute measurement emulator setting" must be processed through so that the given position will be changed through the inversion.

P-0-0522 - Attributes

Name in German:	Absolutgeber Zählrichtung		
Name in English:	Absolute encoder count direction		
ID number:	P-0-0522	**Editability:**	P2/P3
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	0/1	**Default value:**	--

P-0-1003, Velocity Feedback Value Filtertimebase

Description:

The velocity feedback value filter will be used as a VZ1 low pass filter.This filter time constant is adjusted within this parameter.

With the input of 500usec, the filter is non-functionable.

see also Function description: "Setting the velocity loop"

P-0-1003 - Attributes

Name in German:	Geschwindigkeitsistwert Filterzeitkonstante		
Name in English:	velocity feedback value filtertimebase		
ID number:	P-0-1003	**Editability:**	P234
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	us/us	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	500/65535	**Default value:**	1500

P-0-4000, Current Zero Trim Phase U

Description:

This parameter serves the display of the determined result of the zero trim procedure of the current feedback sensor of the U phase.

P-0-4000 - Attributes

Name in German:	Strommeß-Nullabgleich Phase U		
Name in English:	Current-Zero-Trim Phase U		
ID number:	P-0-4000	**Editability:**	no
Function:	Parameter	**Memory:**	Verst..-E²prom
Data length:	2 Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	no
Unit German/English:	%/%	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	-100,00/100,00	**Default value:**	--

P-0-4001, Current Zero Trim Phase V

Description:

This parameter serves the display of the determined result of the zero trim procedure of the current feedback sensor of the V phase.

P-0-4001 - Attributes

Name in German:	Strommeß-Nullabgleich Phase V		
Name in English:	Current-Zero-Trim Phase V		
ID number:	P-0-4001	**Editability:**	no
Function:	Parameter	**Memory:**	Verst..-E²prom
Data length:	2 Byte	**validity check:**	no
Format:	DEC_MV	**Extreme value check:**	no
Unit German/English:	%/%	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	-100,00/100,00	**Default value:**	--

P-0-4002, Current Amplify Trim Phase U

Description:

For trimming of the current sensors regarding its amplifier error, this parameter will specify testing areas with DKC devices.

P-0-4002 - Attributes

Name in German:	Strommeßverstärkungsabgleich		
Name in English:	Current-Amplify-Trim Phase U		
ID number:	P-0-4002	**Editability:**	no
Function:	Parameter	**Memory:**	Verst.-E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	4	**cyc. transmittable:**	no
Input value min / max:	0,0001/2,0000	**Default value:**	--

P-0-4003, Current Amplify Trim Phase V

Description:

For trimming of the current sensors regarding the amplifier error, this parameter will specify the test field for DKC drives.

P-0-4003 - Attributes

Name in German:	Strommeßverstärkungsabgleich Phase V		
Name in English:	Current-Amplify-Trim Phase V		
ID number:	P-0-4003	**Editability:**	no
Function:	Parameter	**Memory:**	Verst.-E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	4	**cyc. transmittable:**	no
Input value min / max:	0,0001/2,0000	**Default value:**	--

P-0-4004, Magnetization Current

Description:

In this parameter, someone from Indramat will install the set nominimal or servo magnetization current for asynchronous motors.

With synchronous motors, this parameter will automatically be set to 0.

The DKC controller can be functioned with MKD or MDD motors.

P-0-4004 - Attributes

Name in German:	Magnetisierungsstrom		
Name in English:	Magnetizing current		
ID number:	P-0-4004	**Editability:**	P23
Function:	Parameter	**Memory:**	fixed
Data length:	4 Byte	**validity check:**	no
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	4	**cyc. transmittable:**	no
Input value min / max:	0/400000	**Default value:**	0

P-0-4005 Back EMF Constant

Description:

This parameter has no meaning.

P-0-4005 - Attributes

Name in German:	EMK-Konstante		
Name in English:	Back emf constant		
ID number:	P-0-4005	**Editability:**	--
Function:	Parameter	**Memory:**	fixed
Data length:	4 Byte	**validity check:**	no
Format:	decimal	**Extreme value check:**	no
Unit German/English:	Vs/rad/ / Vs/rad	**combination check:**	no
Posit. after the dec.:	4	**cyc. transmittable:**	no
Input value min / max:	0,0001/ 429496,7295		
Default value:	0		

P-0-4006, Process Block Target Position

Description:

List of the target positions for the command operated function (positioning interface).It can be given a maximum of 32 position values whereby the first elemet specifies the target position of the process block 0 and the second position specifies the target position of the second process block 1...

The number of the target positions must always be larger or equal to the number of the operational process block.If process block are selected of which there are no target positions, then the warning „non-programmed process block" will be given.

P-0-4006 - Attributes

Name in German:	Verfahrsatz Zielposition		
Name in English:	Process block Target Position		
ID number:	P-0-4006	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	list with 32 elements each with 4 Byte, 128 Byte		
validity check:	yes		
Format:	S-0-0076	**Extreme value check:**	yes
Unit German/English:	S-0-0076/S-0-0076	**combination check:**	no
Posit. after the dec.:	S-0-0076	**cyc. transmittable:**	no
Input value min / max:	S-0-0076/S-0-0076	**Default value:**	--

P-0-4007, Process Block Velocity

Description:

List of the process block velocity for command controled operation (positioning interface).It can be given a maximum of 32 velocities whereby the first element specifies the maximum velocity of the process block 0, the second element specifies the maximum velocity of the process block 1...

The number of the process block velocities must always be larger or equal to the number of operational process block.If process blocks is selected of which there are no process block velocities, then the warning **"non-programmed process block"** will be given.

P-0-4007 - Attributes

Name in German:	Verfahrsatz Geschwindigkeit		
Name in English:	Process block Velocity		
ID number:	P-0-4007	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	list with 32 elements each with 4 Byte, 128 Byte		
validity check:	yes		
Format:	S-0-0044	**Extreme value check:**	yes
Unit German/English:	S-0-0044/S-0-0044	**combination check:**	no
Posit. after the dec.:	S-0-0044	**cyc. transmittable:**	no
Input value min / max:	S-0-0044/S-0-0044	**Default value:**	100,0000

P-0-4008, Process Block Acceleration

Description:

List of the acceleration for the command controled operation (positioning interface).It can be given a maximum of 32 acceleration values whereby the first element specifies the maximum acceleration of the process block 0, the second element specifies the maximum acceleration of the process block 1....

The number of accelerations must always be larger or equal to the number of operation process blocks.If process blocks are selected of which there are no acceleration, then the warning „non-programmed method operation" will be given.

P-0-4008 - Attributes

Name in German:	Verfahrsatz Beschleunigung		
Name in English:	Process block Acceleration		
ID number:	P-0-4008	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	list with 32 elements each with 4 Byte, 128 Byte		
validity check:	yes		
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	S-0-0160/S-0-0160	**combination check:**	no
Posit. after the dec.:	S-0-0160	**cyc. transmittable:**	no
Input value min / max:	S-0-0160/S-0-0160	**Default value:**	1000,000

P-0-4009, Process Block Jerk

Description:

List of the jerk limit value for command controled operation (positioning interface).It can be given a maximum of 32 jerk limit values whereby the first element specifies the maximum jerk limit value of the process block 0, the second element specifies the maximum jerk value of the process block 1....

The number of the jerk limit values must be larger or equal to the number of operation process blocks.If process blocks are selected of which there are no jerk limit values, then the warning „non-programmed process block" will be given.

With an input of 0, the jerk limitation can be turned off.

P-0-4009 - Attributes

Name in German:	Verfahrsatz Ruck		
Name in English:	Process block Jerk		
ID number:	P-0-4009	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	yes
Data length:	list with 32 elements each with 4 Byte, 128 Byte		
validity check:	yes		
Format:	Parameter	**Extreme value check:**	no
Unit German/English:	S-0-0160/S-0-0160	**combination check:**	no
Posit. after the dec.:	S-0-0160	**cyc. transmittable:**	no
Input value min / max:	S-0-0160/S-0-0160	**Default value:**	0

P-0-4010, Load Inertia

Description:

The determined load inertia is within this parameter independent of **P-0-0510, moment of inertia of the rotor**.The load inertia is used for the optimizing of the meaning of the rotation velocity control, which will **not be used** in the available versionThe load functions rotationally on the referred motor.

P-0-4010 - Attributes

Name in German:	Lastträgheitsmoment		
Name in English:	Load Inertia		
ID number:	P-0-4010	**Editability:**	P234(always)
Function:	Parameter	**Memory:**	Param.-E²prom
Data length:	4 Byte	**validity check:**	Phase 3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	kg m²/kg m²	**combination check:**	no
Posit. after the dec.:	5	**cyc. transmittable:**	no
Input value min / max:	0/21474.83647	**Default value:**	0

P-0-4011, Switch Frequency

Description:

With this parameter, the switch frequency of the pulse switching controler can be set to the value of 4 and 16 kHz.

P-0-4011 - Attributes

Name in German:	Schaltfrequenz		
Name in English:	Switch frequency		
ID number:	P-0-4011	**Editability:**	P23
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	kHz/kHz	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	4/8	**Default value:**	4

P-0-4012, Slip Factor

Description:
The parameter has no meaning

P-0-4012 - Attributes

Name in German:	Schlupffaktor		
Name in English:	Slip factor		
ID number:	P-0-4012	**Editability:**	-
Function:	Parameter	**Memory:**	fixed
Data length:	2 Byte	**validity check:**	-
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	Hz/100A/Hz/100A	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	-/-	**Default value:**	0

P-0-4013 Maximum Rotor Frequency

Description:
The parameter has no meaning

P-0-4013 - Attributes

Name in German:	Maximale Rotorfrequenz		
Name in English:	Maximum rotor frequency		
ID number:	P-0-4013	**Editability:**	-
Function:	Parameter	**Memory:**	fixed
Data length:	2 Byte	**validity check:**	-
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	Hz/Hz	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	-/-	**Default value:**	0

P-0-4014, Motor Type

Description:

With this parameter, the motor type will be selected. The parameter is not changeable because the operation of synchronous motors is only possible.

- 1:Synchronous motor

P-0-4014 - Attributes

Name in German:	Motorart		
Name in English:	Motor Type		
ID number:	P-0-4014	**Editability:**	no
Function:	Parameter	**Memory:**	Param.E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/5	**Default value:**	--

P-0-4015, Circle Voltage

Description:

The circle voltage is stored as a parameter in the amplifier.

The parameter is not editable and serves only the display as well as internal calculations (PWM).

P-0-4015 - Attributes

Name in German:	Zwischenkreisspannung		
Name in English:	Circle-Voltage		
ID number:	P-0-4015	**Editability:**	no
Function:	Parameter	**Memory:**	Verst.-E²prom
Data length:	2 Byte	**validity check:**	Phase3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	V/V	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	1/1000	**Default value:**	--

P-0-4016, Dynamic Compensation

Description:

The parameter has no meaning

P-0-4016 - Attributes

Name in German:	Dynamischer Kommutierungsoffset		
Name in English:	Dynamic compensation		
ID number:	P-0-4016	**Editability:**	-
Function:	Parameter	**Memory:**	Amplifier E²Prom
Data length:	2 Byte	**validity check:**	yes
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	Grad/1000Upm/Grad/1000Upm		
combination check:	no		
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0,00/3,80	**Default value:**	0

P-0-4017, Offset of the Analog Torque Command

Description:

With this parameter, a offset of the analog torque command can be set.An available offset which lies in the signal path of the analog signal can be regulated.

P-0-4017 - Attributes

Name in German:	Offset des analogen Momenteneingangs		
Name in English:	Offset of the analog torque command input		
ID number:	P-0-4017	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	mV/mV	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	-10000/+10000	**Default value:**	0

P-0-4018, Offset of the Analog Velocity Command Input

Description:

With this parameter, a offset of the analog rotational velocity input be set. An available offset which lies in the signal path of the analog signal can be regulated.

P-0-4018 - Attributes

Name in German:	Offset des analogen Drehzahlsollwertes		
Name in English:	Offset of the analog velocity command input		
ID number:	P-0-4018	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	mV/mV	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	-10000/+10000	**Default value:**	0

P-0-4019, Process Block Mode

Description:

Setup of the process block mode („relative process block," „absolute process block,"„movement in positive direction" or „movement in negative direction") for each seperate process block.The first element of this list specifies the mode of the process block 0, the second specifies the mode of the process block 1.

process mode	Setup value
Absolute process block	1 h
relative process block	2 h
Movement in positive direction	4 h
Movement in negative direction	8 h

Figure 3-9: adjustable process block modi

The number of process block modi must always be larger or equal to the number of operation process blocks.If process blocks are selected of which there are no process modes, then the warning „non-programmed process block" will be given.

P-0-4019- Attributes

Name in German:	Verfahrsatz Modus		
Name in English:	Process block Mode		
ID number:	P-0-4019	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	list with 32 elements each with 4 Byte, 64 Byte		
validity check:	yes		
Format:	HEX	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	1

P-0-4020, Encoder Emulation Type

Description:

Setup, if incremental or absolute feedback position output should be reached.

Feedback positional output	Encoder Emulation Type P-0-4020
Incremental control emulation	1
Absolute control emulation (SSI-emulation)	2
no output	0

Figure 3-10: control emulation types

P-0-4020-Attributes

Name in German:	Geberemulationsart		
Name in English:	Encoder emulation type		
ID number:	P-0-4020	**Editability:**	P2
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	-/-	**combination check:**	no
Posit. after the dec.:	-	**cyc. transmittable:**	no
Input value min / max:	0/2	**Default value:**	1

P-0-4021, Baud - Rate (RS232/485)

Description:

There can be different baud rates set for the communication over the serial interface.

Baud rate [Baud]	Setting in parameter P-0-4021
9600	0
19200	1

Figure 3-11: adjustable baud rates

Note: The baud rate is not adjustable in the list of all parameters in Drive Top because locks itself out of other communication.

see also Function description: "Communication parameter"

P-0-4021 Attributes

Name in German:	Baud - Rate (RS232/485)		
Name in English:	Baud rate (RS232/485)		
ID number:	P-0-4021	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	-/-	**combination check:**	no
Posit. after the dec.:	-	**cyc. transmittable:**	no
Input value min / max:	0/3	**Default value:**	0

P-0-4022, Drive Address

Description:

The drive address will be set here.With communication over RS485-interface with more than one drive, each drive must contain different addresses so that at anytime only the addressed drive reacts.

There can be addresses set from 0 to 99.

The selection of the drive with the desired address is successful in a terminal program through BCD: Drive Address.

see also Function description: "Communication parameter"

P-0-4022 Attributes

Name in German:	Antriebsadresse		
Name in English:	Drive address		
ID number:	P-0 4022	**Editability:**	P2
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	0/99	**Default value:**	1

P-0-4023, C4 Command: Switch to Parameter Mode

Description:

Switching command from drive mode(ie out of phase 3 (P3)) into the parameter mode(Phase 2(P2)).

The command can only be processed if the control opening in turned off.

see also Function description: "Communication parameter"

P-0-4023-Attributes

Name in German:	C4 Umschalten auf Phase 2		
Name in English:	C4 Command: Switch to parameter mode		
ID number:	P-0-4023	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	binary	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	0/11 b	**Default value:**	--

P-0-4024, Test Status

Description:

Serves for information about the product advancement in operation.

P-0-4024-Attributes

Name in German:	Prüfstatus		
Name in English:	Test status		
ID number:	P-0-4024	**Editability:**	-
Function:	Parameter	**Memory:**	Amplifier E²Prom
Data length:	2 Byte	**validity check:**	yes
Format:	HEX	**Extreme value check:**	no
Unit German/English:	-/-	**combination check:**	no
Posit. after the dec.:	-	**cyc. transmittable:**	no
Input value min / max:	-/-	**Default value:**	no

P-0-4025, Password

Description:

With version 02VRS there is a supervisor password in a fixed parameter to edit during operation.

P-0-4025-Attributes

Name in German:	Passwort		
Name in English:	Password		
ID number:	P-0-4025	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	0 byte-maximum 10 symbols		
validity check:	yes		
Format:	ASCII	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-4026, Process Block Selection

Description:

With this parameter, it can be read from „drive stop" which of the input signals P0 to P5 is the selected process block. If the device finds itself in „device opening(AF)", then the number of the positioning command, which immediately will be worked on, can be read here.

P-0-4026-Attributes

Name in German:	Verfahrsatzauswahl		
Name in English:	Process block selection		
ID number:	P-0-4026	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	0/31	**Default value:**	--

P-0-4027, Function Parameter

Description:

Bit list with different function in the company products (ie can be turned of).

Structure of the parameter:

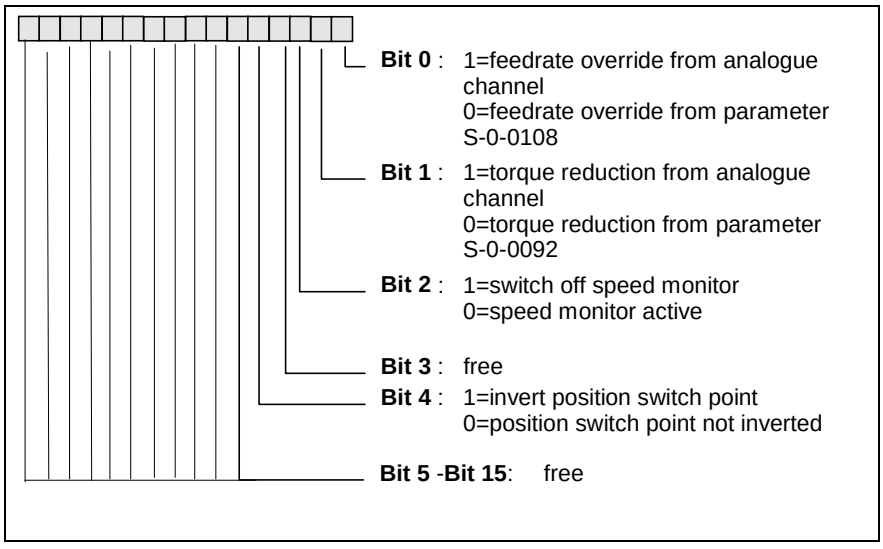

Bit 0 : 1=feedrate override from analogue channel
0=feedrate override from parameter S-0-0108
Bit 1 : 1=torque reduction from analogue channel
0=torque reduction from parameter S-0-0092
Bit 2 : 1=switch off speed monitor
0=speed monitor active
Bit 3 : free
Bit 4 : 1=invert position switch point
0=position switch point not inverted
Bit 5 -Bit 15: free

Figure 3-12: P-0-4027, Function Parameter

P-0-4027-Attributes

Name in German:	Funktionsparameter		
Name in English:	Function parameter		
ID number:	P-0-4027	**Editability:**	P2
Function:	rameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	HEX	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	0 x 0008

P-0-4028, Impulse Wire Feedback Offset

Description:

With this parameter, the offset of the impulse feedback for resolve control will be stored.

It will be available during construction and stored in the feedback memory.

P-0-4028-Attributes

Name in German:	Impulsdrahtgeber-Offset		
Name in English:	Impulse wire feedback - Offset		
ID number:	P-0-4028	**Editability:**	no
Function:	Parameter	**Memory:**	Feedb.-E²prom
Data length:	4 Byte	**validity check:**	no
Format:	DEC	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	100,0000

P-0-4029, Impulse Wire Feedback PIC Counter Value

Description:

This parameter contains the information of the absolute position of the control.

The value will be actualized with each initializing position.It is not editable from the user.

P-0-4029-Attributes

Name in German:	Impulsdrahtgeber-Zählerstand		
Name in English:	impulse wire feedback - PIC counter value		
ID number:	P-0-4029	**Editability:**	no
Function:	Parameter	**Memory:**	Feedb.-E²prom
Data length:	4 Byte	**validity check:**	no
Format:	HEX	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	100,0000

P-0-4030, Jog Velocity

Description:

Limit value for the movement velocity during movement over the jog input.The value must be smaller than what is in the parameter S-0-0091„limit velocity value bipolar."

The movement velocity will also be controled from **"feed rate override"**.

P-0-4030-Attributes

Name in German:	Tipp-Geschwindigkeit		
Name in English:	Jog velocity		
ID number:	P-0-4030	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	4 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	S -0-0044/S -0-0044		
combination check:	no		
Posit. after the dec.:	S -0-0044	**cyc. transmittable:**	no
Input value min / max:	S -0-0044/S -0-0044		
Default value:	100,0000		

P-0-4031, Absolute Encoder Emulator Offset

Description:

The parameter serves for the initializing position of the absolute encoder emulation (SSI-output).The parameter will be edited by the „absolute measurement emulator setting" from the company product.

P-0-4031-Attributes

Name in German:	Absolutgeber-Emulator-Offset		
Name in English:	Absolute encoder emulation offset		
ID number:	P-0-4031	**Editability:**	no
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	4 Byte	**validity check:**	only with SSI Emulation
Format:	HEX	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-4032, C3 Command Set Emulation-Absolute Value

Description:

With this command, the position which is recorded in parameter P-0-0515 will be given in the absolute encoder interface.The command can only be processed if the control opening in turned off.

see also Function description: "Disengagement of a command"

P-0-4032-Attributes

Name in German:	C3 Kommando Absolutmaß-Emulator setzen		
Name in English:	C3 Command set emulation-absolute value		
ID number:	P-0-4032	**Editability:**	P4
Function:	Command	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	binary	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	yes
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	0/11	**Default value:**	--

P-0-4033, Steps per Revolution

Description:

The number of revolutions which will be required in order for the mechanical motor rotation movement with the motor interface.

P-0-4033-Attributes

Name in German:	Schritte pro Umdrehung		
Name in English:	Steps per revolution		
ID number:	P-0-4033	**Editability:**	P23
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	4 Byte	**validity check:**	yes
Format:	binary	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	16/65536	**Default value:**	1250

P-0-4034, Stepper Motor Interface Mode

Description:

Setup of the mode of stepper motor control signals.

Stepper motor signals	Setting
Quadrature signals	1
Forward/backward signals	2
Step and direction signals	3

Figure 3-13:Stepper motor modes

P-0-4034-Attributes

Name in German:	Modus Schrittmotorschnittstelle		
Name in English:	Stepper motor interface mode		
ID number:	P-0-4034	**Editability:**	P2
Function:	Parameter	**Memory:**	parallel EEProm
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	1/3	**Default value:**	1

P-0-4035, Anbalanced Current

Description:

In this parameter, the current value is stored which with the scaling of the **current measurement** of the drive control is precisely compared.With this, system errors in the current measurement will be eliminated.The value has no meaning to the user and it is **not changeable**.

P-0-4035-Attributes

Name in German:	Abgleichstrom		
Name in English:	Unbalanced Current		
ID number:	P-0-4035	**Editability:**	no
Function:	Parameter	**Memory:**	Verst.-EEPROM
Data length:	4 Byte	**validity check:**	Phase 3
Format:	DEC_OV	**Extreme value check:**	yes
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	0/500	**Default value:**	--

P-0-4036, Contacted Motor Type

Description:

In this parameter, the drive control marks itself as the type of the contacted motor type in text format.

If this locked type during heavy switching in the drive mode deviates from out of the read feedback **S-0-0141, motortype**, a new motor would be contacted.The the server will be required to show the display „**UL** (basic load) for initialization of the motor dependent parameter;see command **S-0-0262, basic load**.Under this parameter, the „Contacted Motorype" will be overwritten with the basic load.

P-0-4036-Attributes

Name in German:	Angeschlossener Motortyp		
Name in English:	Contacted Motor Type		
ID number:	P-0-4036	**Editability:**	P234
Function:	Parameter		
Memory:	Parameter-EEPROM		
Data length:	up to 40 symbols	**validity check:**	Phase 3
Format:	ASCII	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	empty

P-0-4037, Default Velocity Loop Proportional Gain

Description:

The default value for the velocity encodere-proportional amplifier. The parameter will be determined during the manufacturing stage and cannot be changed. With the „default parameter load", the value of the parameter will be copied into the parameter **S-0-0100, velocity loop proportional gain**.

With the default values, a drive of the motor is possible; for optimal adaptation on the machine connection, the parameter S-0-0100 must sill be optimized.

P-0-4037-Attributes

Name in German:	Default Drehzahlregler-Proportionalverstärkung		
Name in English:	Default velocity loop proportional gain Kp		
ID number:	P-0-4037	**Editability:**	no
Function:	Parameter	**Memory:**	Feedback
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	As/rad/As/rad	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	0/32767	**Default value:**	--

P-0-4038, Default Velocity Loop Integral Action Time

Description:

The default value for the velocity loop integral action time. The parameter will be determined during the manufacturing stage and cannot be changed. With the „default parameter load", the value of the parameter will be copied into the parameter **S-0-0101, velocity loop integral action time**.

With the default values, a drive of the motor is possible; for optimal adaptation on the machine connection, the parameter **S-0-0101** must sill be optimized.

P-0-4038-Attributes

Name in German:	Defaultwert Drehzahlregler-Nachstellzeit		
Name in English:	Default Velocity loop integral action time		
ID number:	P-0-4038	**Editability:**	no
Function:	Parameter	**Memory:**	Feedback
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	ms/ms	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	0,1/6553,5	**Default value:**	--

P-0-4039, Default Current Loop Proportional Gain

Description:

The defaul value for the current loop proportional gain. The parameter will be determined during the manufacturing stage and cannot be changed. With the „default parameter load", the value of the parameter will be copied into the parameter **S-0-0106, proportional gain 1 current regulator**.

The current loop gain is already optimized and may not be changed.

P-0-4039-Attributes

Name in German:	Default Stromregler-Proportionalverstärkung		
Name in English:	Default current loop proportional gain		
ID number:	P-0-4039	**Editability:**	no
Function:	Parameter	**Memory:**	Feedback
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	V/A/V/A	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0/500	**Default value:**	--

P-0-4040, Digital Inputs

Description:

Bit list for reading by the digital input signals of the DKC.

1 means:At the input there is a voltage of about 24V.

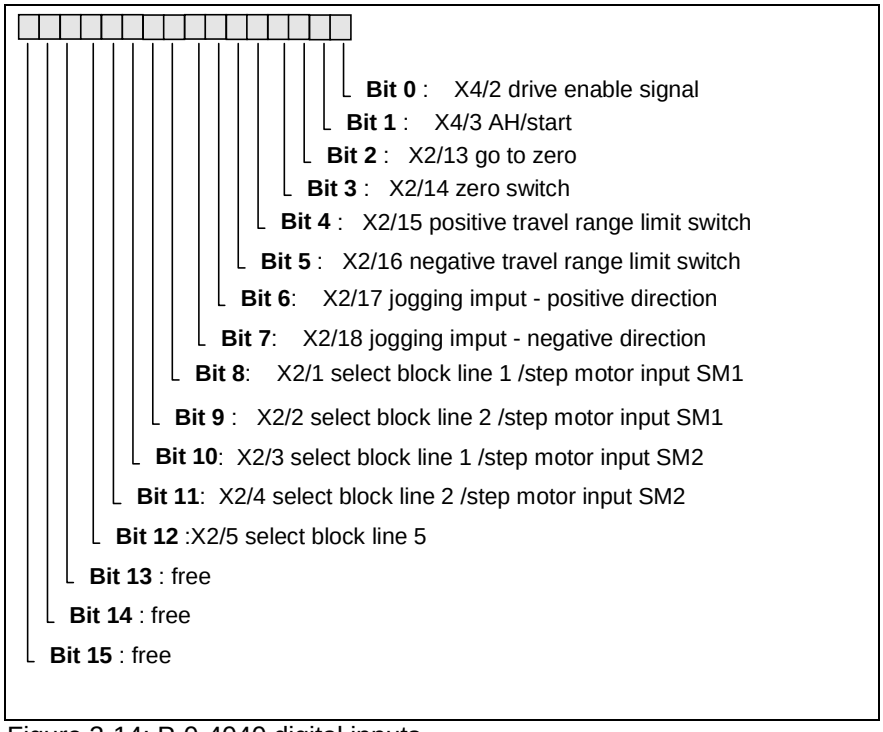

Bit 0 : X4/2 drive enable signal
Bit 1 : X4/3 AH/start
Bit 2 : X2/13 go to zero
Bit 3 : X2/14 zero switch
Bit 4 : X2/15 positive travel range limit switch
Bit 5 : X2/16 negative travel range limit switch
Bit 6: X2/17 jogging imput - positive direction
Bit 7: X2/18 jogging imput - negative direction
Bit 8: X2/1 select block line 1 /step motor input SM1
Bit 9 : X2/2 select block line 2 /step motor input SM1
Bit 10: X2/3 select block line 1 /step motor input SM2
Bit 11: X2/4 select block line 2 /step motor input SM2
Bit 12 :X2/5 select block line 5
Bit 13 : free
Bit 14 : free
Bit 15 : free

Figure 3-14: P-0-4040 digital inputs

P-0-4040-Attributes

Name in German:	Digitale Eingänge		
Name in English:	Digital Inputs		
ID number:	P-0-4040	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	Byte	**validity check:**	no
Format:	binary	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-4041, Digital Outputs

Description:

Bit list for reading by the digital output signals of the DKC.

1 means:At the output there is 24V.

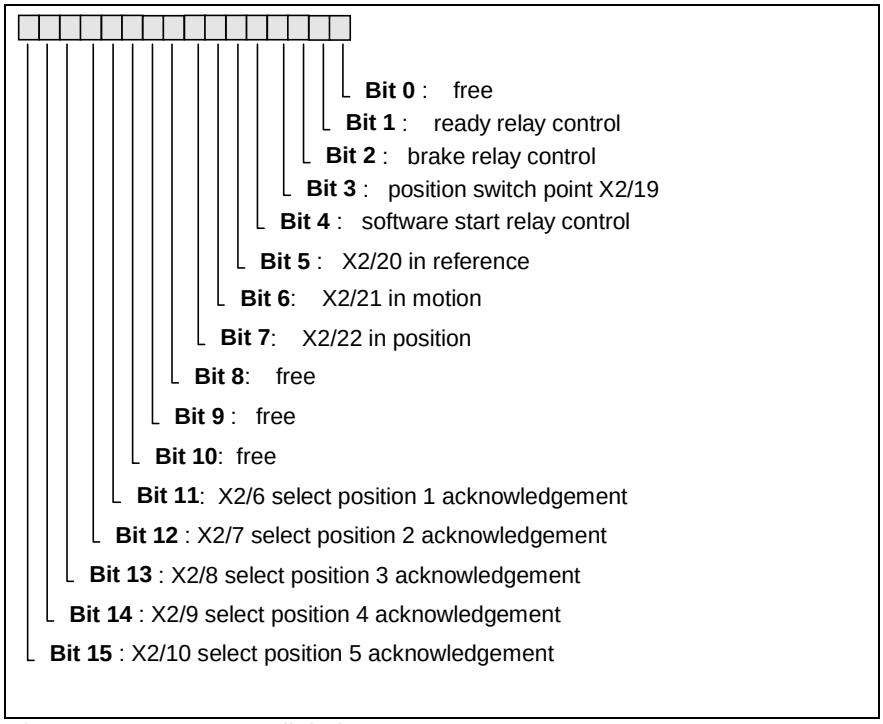

Bit 0 : free
Bit 1 : ready relay control
Bit 2 : brake relay control
Bit 3 : position switch point X2/19
Bit 4 : software start relay control
Bit 5 : X2/20 in reference
Bit 6: X2/21 in motion
Bit 7: X2/22 in position
Bit 8: free
Bit 9 : free
Bit 10: free
Bit 11: X2/6 select position 1 acknowledgement
Bit 12 : X2/7 select position 2 acknowledgement
Bit 13 : X2/8 select position 3 acknowledgement
Bit 14 : X2/9 select position 4 acknowledgement
Bit 15 : X2/10 select position 5 acknowledgement

Figure 3-15: P-0-4041 digital outputs

P-0-4041-Attributes

Name in German:	Digitale Ausgänge		
Name in English:	Digital outputs		
ID number:	P-0-4041	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	binary	**Extreme value check:**	no
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-4042, Default Velocity Loop Delay Time

Description:

The defaul value for the velocity loop delay time. The parameter will be determined during the manufacturing stage and cannot be changed. With the „default parameter load", the value of the parameter will be copied into the parameter **P-0-0004, velocity encoder smoothing time constant**.

P-0-4042-Attributes

Name in German:	Defaultwert Drehzahlregler-Glättungszeitkonstante		
Name in English:	Default Velocity loop delay time		
ID number:	P-0-4042	**Editability:**	no
Function:	Parameter	**Memory:**	Feedback
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	us/us	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	500/65535	**Default value:**	--

P-0-4043, Bleed Overload Factor

Description:

The parameter describes the short timed overloadablility of the installed damping resistance.If the bleed overload factor = 60, then the peak capacity of the damping resistance is 60 times larger than the time capacity. The parameter will be determined during the manufacturing stage and cannot be changed.

P-0-4043-Attributes

Name in German:	Bleederüberlastfaktor		
Name in English:	Bleederoverloadfactor		
ID number:	P-0-4043	**Editability:**	no
Function:	Parameter		
Memory:	Amplifier EEProm		
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/100	**Default value:**	--

P-0-4044, Bleeder load

Description:

With this parameter, the average capacity will be read from which the damping resistance will be changed.

That means that the dampening resistance with its time capacity will be 100 % acted upon.For a secure drive, the burden should be less than 80%The value is very strongly stabilized.

In order to tell if a processing cycle of the dampening resistance is not overly loaded, the analog signal „bleeder load" must be considered.

P-0-4044 Attributes

Name in German:	Bleederauslastung		
Name in English:	Bleeder Load		
ID number:	P-0-4044	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	decimal	**Extreme value check:**	no
Unit German/English:	%/%	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/65536	**Default value:**	--

P-0-4045, Active Continuous Current

Description:

This parameter shows how much current the drive can supply in the actual combination in continual operation.Multiplied with the **P-0-0051, torque constant** of the motor yields the continual operational torque.

This parameter will calculate during heavy switching in the drive mode from the drive control and is not changeable.With the activation of this limit, the following **current and torque limitations and settings** shrink.

ID Number	Name	Unit
S-0-0111	Still stand active current motor 1)	A
S-0-0112	Amplifier active current 1	A
P-0-0518	Amplifier nominal current 2	A
S-0-0092	Torque limit bipolar 2)	%
P-0-0006	Overload factor 3)	%

Figure 3-16: Active durration current, Dependence

1) The standstill active current of the motor is that value of which the procentage specifications pocess: it corresponds to 100%.

2) Shrinks if less than 100%

3) The dependence on the overload factor is not linear. It is observeable in connection with the active current 1 and the nominal current 2.

P-0-4045-Attributes

Name in German:	Wirksamer Dauerstrom		
Name in English:	Active continuous Current		
ID number:	P-0-4045	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	4 Byte	**validity check:**	no
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-4046, Active Peak Current

Description:

This parameter show how much current the drive can supply in the actual combination **momentarily** (0,4s) of operation.Multiplied with the **P-0-0051, torque constant** of the motor yields the momentary operation torque(ie for acceleration operations).

This parameter will calculate during heavy switching in the drive mode from the drive control and is not changeable. With the activation of this limit, the following **current and torque limitations and settings** shrink.

ID Number	Name	Unit
S-0-0109	Motor peak current	A
S-0-0110	Amplifier peak current 1	A
P-0-0519	Amplifier peak current 2	A
S-0-0092	Torque limit bipolar	%
P-0-0006	Overload factor 3)	%

Figure 3-17: Active peak current, dependence

The dependence on the overload factor is not linear. It can be seen in connection with peak current 1 and peak current 2.

P-0-4046-Attributes

Name in German:	Wirksamer Spitzenstrom		
Name in English:	Active peak Current		
ID number:	P-0-4046	**Editability:**	no
Function:	Parameter	**Memory:**	no
Data length:	4 Byte	**validity check:**	no
Format:	DEC_OV	**Extreme value check:**	no
Unit German/English:	A/A	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	--/--	**Default value:**	--

P-0-4047, Motor Inductance

Description:

Measured inductance of the motor between two clamped connections.

The parameter will be determined during the manufacturing stage and cannot be changed.

P-0-4047-Attributes

Name in German:	Motorinduktivität		
Name in English:	Motor inductance		
ID number:	P-0-4047	**Editability:**	no
Function:	Parameter	**Memory:**	Feedback
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	no
Unit German/English:	mH/mH	**combination check:**	no
Posit. after the dec.:	2	**cyc. transmittable:**	no
Input value min / max:	0/65535	**Default value:**	--

P-0-4048, Stator Resistance

Description:

Measured stator resistance of the motor between two connection clamps.

The parameter will be determined during the manufacturing stage and cannot be changed.

P-0-4048-Attributes

Name in German:	Wicklungswiderstand		
Name in English:	Stator resistance		
ID number:	P-0-4048	**Editability:**	no
Function:	Parameter	**Memory:**	Feedback
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	no
Unit German/English:	Ohm/Ohm	**combination check:**	no
Posit. after the dec.:	3	**cyc. transmittable:**	no
Input value min / max:	0/65,535	**Default value:**	--

P-0-4049, Default Current Loop Integral Action Time

Description:

The default value for the current loop integral action time. The parameter will be determined during the manufacturing stage and cannot be changed. With the „default parameter load", the value of the parameter will be copied into the parameter **S-0-0107, current regulator 1 integral action timeve**.

The current loop integral action time is already optimized and may not be changed.

P-0-4049-Attributes

Name in German:	Defaultwert Stromregler-Nachstellzeit		
Name in English:	Default Current loop integral action time		
ID number:	P-0-4049	**Editability:**	no
Function:	Parameter	**Memory:**	Feedback
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	ms/ms	**combination check:**	no
Posit. after the dec.:	1	**cyc. transmittable:**	no
Input value min / max:	0/6553,5	**Default value:**	--

P-0-4050, Delay Answer RS232/485

Description:

Defining the minimal time that must pass after the last symbol of a telegram would be received over the serial interface and before the first symbol of the reaction may be sent.This time span will be required with the drive of an RS485 for the switch from send to recieve drive (ie required switch).For the drive of a RS232, this parameter is not necessary and inspite of this should be set at 1ms.

see also Function description: "Communication parameter"

P-0-4050-Attributes

Name in German:	Antwortverzögerung RS232/485		
Name in English:	Delay answer RS232/485		
ID number:	P-0-4050	**Editability:**	P2/P3/P4
Function:	Parameter	**Memory:**	yes
Data length:	2 Byte	**validity check:**	yes
Format:	decimal	**Extreme value check:**	yes
Unit German/English:	ms/ms	**combination check:**	no
Posit. after the dec.:	0	**cyc. transmittable:**	no
Input value min / max:	0/200	**Default value:**	0

P-0-4094, Command Parameter Default Set

Description:

With the operation of this command, all parameters will be placed in the parallel EEProm with the EEProm stored values.Invalid parameters will be corrected.

After the trade of the company version, all parameter will be set as invalid.THe drive calls then „PL" on the seven segment display (the serial interface is still not active).By pressing the button S1, this command will also be started so that all the parameters stay on the default value.

P-0-4094-Attributes

Name in German:	Kommando Parameter-Default-Setting		
Name in English:	Command Parameter-Default-Set		
ID number:	P-0-4094	**Editability:**	P2
Function:	Command	**Memory:**	no
Data length:	2 Byte	**validity check:**	no
Format:	binary	**Extreme value check:**	yes
Unit German/English:	--/--	**combination check:**	no
Posit. after the dec.:	--	**cyc. transmittable:**	no
Input value min / max:	0/11 b	**Default value:**	--

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ECODRIVE
DKC01.1/DKC11.1
Drive Controllers

Supplement B
Diagnostic message description
ASE 02VRS

DOK-ECODRV-ASE-02VRS**-FKB1-EN-P • 07.96

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1 DIAGNOSTIC MESSAGE DESCRIPTION

1.1 Tips for Eliminating Malfunctions

The following diagnostic descriptions explain the meaning of the H1 condition display on the DKC. The meaning, possible causes for the error, and the means of prevention are described in this section.

If a malfunction cannot be eliminated with the help of the diagnostic descriptions, please contact **INDRAMAT** customer service.

Reset Button S1

After the error has been eliminated the error message must be cleared by pressing the clear error button S1. The drive controller has an error memory which works on the "first-in, first-out" principle. If several errors occur in a row, the first 4 will be saved. The error which occurred first is displayed on H1. Each time the S1 key is pressed, the error which is displayed will be cleared and the next error will appear in the display until all of the saved errors have been cleared.

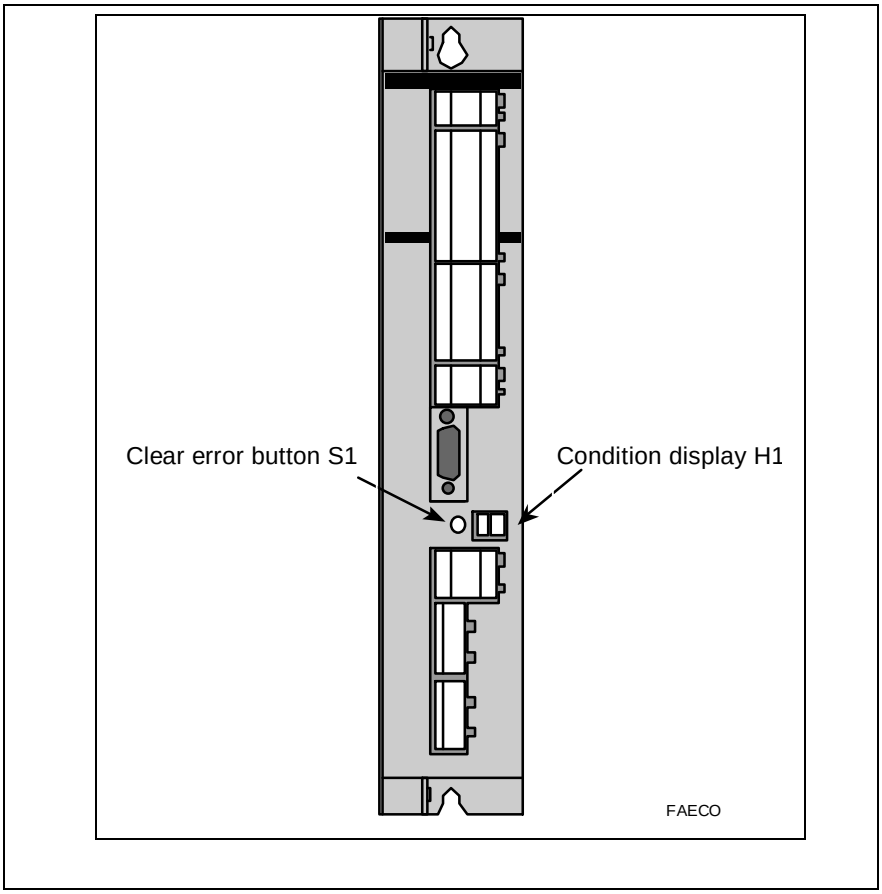

Figure 1-1: Condition diagnosis H1 and clear error button S1 on the DKC01

Condition Display H1

The H1 condition display on the front side of the DKC gives information about:

- Operating condition of the drive controller
- Drive controller or cable malfunctions
- Motor malfunctions
- Malfunctions caused by invalid parameter input
- Application errors

1.2 Error Diagnostic Message

UL Motor Type not Reported

Description:

The settings for current regulation, velocity command, and position loop are stored in the feedback of the motor. After powering up, the drive compares the motr type stored in the parameters with the connected motor type. If the two do not match, the drive remains at this state.

By pressing the S1 button, the drive overwrites its stored parameters with the control loop parameters fron the motor feedback.

Cause:

Motor was exchanged.
The paramter "**P-0-4036, contacted motor type"** from which the motor type is selected would be loaded.

Remedy:

Command "C700 Basic Load" or press the S1 button.

F208 Attributes

SS Display :	UL
Diagnostic message :	F208 Motor Type not reported
	F208 Motor Type not reported
Diagnostic message number :	F208
Error class :	Non-fatal
Error number :	208

PL Default Value of the Parameter Load

Description:

After the exchange of the product (EPROMs), if the parameters have been changed in regards to the old product, the drive displays "**PL**". By pressing the S1 button on the drive or through starting of the command "load basic parameters", all the parameters will be erased and restored with the default values.

Cause:

Product was exchanged and the number of parameters of the new product had changed in regards to the old.

Remedy:

Press S1 button on the drive controller and all the paramters will be erased and restored with default values

WARNING

⇒ With this procedure all parameters and process blocks will be overwritten.

F209 Attributes

SS Display :	PL
Diagnostic message :	PL Default Value of the Parameter Load
	PL Default Value of the Parameter Load
Diagnostic message number :	PL
Error class :	Non-fatal

F207 Switching to an Uninitialized Operating Mode

Description:

A valid operating mode has not been defined.

In the DKC 01, this error cannot occur because the input of the operating mode will be tested when entered.

Remedy:

Input correct operating mode

F207 attributes

SS Display :	F2/07
Diagnostic message :	F207 Switching to an uninitialized operating mode
	F207 Switching to an uninitialized Operation Mode
Error number :	207
Diagnostic message number :	F207
Error class :	Non-fatal

F218 Heatsink Overtemperature Shutdown

Description:

The temperature of the DKC heatsink will be monitored. If the temperature of the heatsink is too high, the drive will power down in order to protect against damage.

Cause:

1. Ambient temperature is too high. The specified operational data is valid up to an ambient temperature of 45°C.
2. The DKC's heatsink is dirty.
3. Air flow is prevented by other assembly parts or a control cabinet panel assembly.
4. Heatsink blower may be defective

Remedy:

For 1. Reduce the ambient temperature; for example, through cooling of the control cabinet

For 2. Remove any obstruction or dirt from the heatsink.

For 3. Install the device vertically and clear a large enough area for proper heatsink ventilation.

For 4. Exchange drive.

F218 attributes

SS Display :	F2/18
Diagnostic message :	F218 Heatsink overtemperature shut-down
	F218 Heatsink overtemperature shut-down
Error number :	218
Diagnostic message number :	F218
Error class :	Non-fatal

F219 Motor Overtemperature Shutdown

Description:

The motor is too hot. The drive controller has issued the warning "**E251 Motor Overtemperature Warning**" for approx. 30 seconds. The drive immediately shuts down.

Cause:

1. The motor was overloaded. The effective torque demanded from the motor was above its allowable continuous torque level for too long.
2. The motor thermal connection is shorted or grounded.
3. Instability in the velocity loop.

Remedy:

For 1. Check the installation of the motor. If the system has been in operation for a long time, check to see if the the operating conditions have changed. (in regards to pollution, friction, moved components, etc.)

For 2. Check wires and cables to the motor temperature monitor for wire breaks and short circuits.

For 3. Check velocity loop parameters.

F219 Attributes

SS Display :	F2/19
Diagnostic message :	F219 Motor Overtemperature Shutdown
	F219 Motor Overtemperature Shutdown
Error number :	219
Diagnostic message number :	F219
Error class :	Non-fatal

F220 Bleeder Overtemperature Shutdown

Description:

The regenerated energy from the mechanism of the machine via the motor has exceeded the power capability of the bleeder resistor. By exceeding the maximum resistance energy, the drive will shutdown according to the set error reaction. Thereby protecting the bleeder from temperature damage.

Cause:

The reflected energy from the machine's mechanism over the motor is too large.

Remedy:

With too much power ---> reduce the acceleration value

With too much energy ---> reduce the velocity

Check the drive installation.

May require installation of an additional bleeder module.

F220 Attributes

SS Display :	F2/20
Diagnostic message :	F220 Bleeder overtemperature shut-down F220 Bleeder overtemperature shut-down
Error number :	220
Diagnostic message number :	F220
Error class :	Non-fatal

F226 Undervoltage Error

Description:

The level of the DC bus voltage will be monitored by the drive controller. If the DC bus voltage falls below a minimal threshold, the drive independently shuts down according to the set error reaction.

Cause:

1. The power source has been interrupted without first switching off the drive enable (RF).
2. Disturbance in the power supply

Remedy:

For 1 Check the logic regarding the activation of the drive within the connected control.

For 2 Check the power supply.

The error can be cleared by removing the control enable signal.

F226 Attributes

SS Display :	F2/26
Diagnostic message :	F226 Undervoltage Error
	F226 Undervoltage Error
Error number :	226
Diagnostic message number :	F226
Error class :	Non-fatal

F228 Excessive Deviation

Description:

The drive could not process the given command value and reacted according to the set error reaction.

Cause:

1. The acceleration ability of the drive was exceeded.
2. The motor shaft was blocked.
3. Parameterization error in the drive parameters.
4. **"S-0-0159, Monitoring Window"** was parameterized incorrectly

Remedy:

For 1. Check the **Bipolar Torque Limit, S-0-0092** parameter and set it equal to the maximum allowable value for the application.

For 2. Check the mechanical system and eliminate any jamming of the motor shaft

For 3. Check the drive parameters

For 4. **Parameterize "S-0-0159, Monitoring Window"**

F228 Attributes

SS Display :	F2/28
Diagnostic message :	F228 Excessive Deviation
	F228 Excessive Deviation
Error number :	228
Diagnostic message number :	F228
Error class :	Non-fatal

F229 Motor Encoder Error: Quadrant Error

Description:

An encoder signal error was found during the encoder evaluation.

Cause:

1. Defective encoder cable
2. Insulation disturbance on the encoder or the encoder cable
3. Defective drive controller

Remedy:

For 1. Check the encoder cable and change if necessary.

For 2. Use only insulated motor cable and power cables
Separate encoder cable from power cables

For 3. Exchange drive controller

F229 Attributes

SS Display :	F2/29
Diagnostic message :	F229 Motor Encoder Error: Quadrant Error
	F229 Motor Encoder Error: Quadrant Error
Error number :	229
Diagnostic message number :	F229
Error class :	Non-fatal

F248 Low Battery Voltage

Cause:

The connected motor has an absolute encoder. The absolute position information is stored in the motor feedback. This memory has a battery powered backup for the electronic circuit. The battery is designed for a operating life of 10 years. If the battery voltage drops below 2.8 V, this message appears. The absolute encoder function is preserved for about 2 weeks.

Instructions for Exchanging Batteries

Have the following tools and accessories ready:

- Torx screwdriver, size 10
- Needle nose pliers, torque wrench
- New packaged battery (Part No.: 257101)

If the control voltage of the installed battery is turned off, the absolute position is lost.

The absolute position must be re-established through the process of the command **Set Absolute Measurement**.

F248 Attributes

SS Display :	F2/48
Diagnostic message :	F248 Low Battery Voltage
	F248 Low Battery Voltage
Error number :	248
Diagnostic message number :	F248
Error class :	Non-fatal

F262 Status Outputs Short Circuited

Description:

If the status outputs of the DKC are short circuited, the drive controller will issue an error.

Cause:

Short circuited outputs (X2/6, X2/7, X2/8, X2/9, X2/10, X2/20, X2/21, X2/22)

Remedy:

Eliminate short circuit

F262 Attributes

SS Display :	F2/62
Diagnostic message :	F262 Status Outputs Short Circuited
	F262 Status Outputs Short Circuited
Error number :	F262
Diagnostic message number :	262
Error class :	Non-fatal

F276 Absolute Encoder Error, Position Deviation > P-0-0097

Description:

When turning off the drive controller with a absolute encoder (multiturn), the actual feedback position will be stored. When powered up, the absolute position given by the encoder is compared to the stored position. If the deviation is larger than the paramaterized **"Absolute Encoder-Monitoring Window"**, the error **"F276, Absolute Encoder Error"** will appear and be given to the control system.

Cause:

1. Turning on for the first time (invalid stored position).
2. The motor was moved further than allowed by the parameter in the absolute encoder monitoring window, P-0-0097, while it was turned off.
3. Incorrect position initialization

Remedy:

For 1. Press S1 to reset the error and set the absolute position.

For 2. The motor was moved while turned off and sits outside of its permissible position. Check to see if the displayed position is correct in relation to the machine zero point. Reset subsequent errors.

For 3. **An accident may occur by accidental shaft movement.**

Check absolute position informartion. A feedback defect is present if the absolute position information is false. The motor should be exchanged and sent to the INDRAMAT Customer Service .

see also the "Absolute Encoder Monitoring" function description

F276 Attributes

SS Display :	F2/76
Diagnostic message :	F276 Absolute encoder error
	F276 Absolute encoder error
Error number :	276
Diagnostic message number :	F276
Error class :	Non-fatal

F630 Travel Limit Value Exceeded

Description:

The drive controller has been given a position command value which lies outside of the allowable travel area. The drive controller has been instructed to give an error when the travel range has been exceeded.

Exceeding the travel area as an error:

The drive controller brakes with maximum torque. After it has been stopped the drive controller shifts to torque free operation. After the error has been cleared, the drive can be once again activated and moved into the allowable travel area.

Cause:

Position feedback value lies outside of the travel area.

Remedy:

1. Input a command value in the direction of the travel area.
2. Shift the position limits
3. Turn off the position limit monitor

F630 Attributes

SS Display :	F6/30
Diagnostic message :	F630 Travel Limit Value exceeded
	F630 Travel Limit Value exceeded
Error number :	630
Diagnostic message number :	F630
Error class :	Travel range

F644 Travel Limit Switch Detected

Description:

The motor was moved and tripped one of the two travel limit switches. The control drive has been instructed to give an error when the travel range has been exceeded.

Exceeding the travel area as an error:

The drive controller brakes with maximum torque. After it has been stopped the drive controller shifts to torque free operation. After the error has been cleared, the drive can be once again activated and moved into the allowable travel area.

Cause:

One of the travel limit switches was tripped.

Remedy:

1. Input a command value in the direction of the travel area.
2. Move the travel limit switches, if necessary.

3. Turn off the position limit monitor (when displaying the position data in modulo format).

F644 Attributes

SS Display :	F6/44
Diagnostic message :	F644 Travel Limit Switch detected
	F644 Travel Limit Switch detected
Error number :	644
Diagnostic message number :	F644
Error class :	Travel range

F822 Motor Encoder Failure: Signal too Small

Description:

The motor encoder signals are monitored. If the signal amplitudes as measured via AK1 and AK2 are outside of the allowable region between U_{ss} = 12.0V and U_{ss} = 18.0 V, then the error message appears. The drive becomes torque-free and an optional brake is immediately activated.

Cause:

1. Defective feedback cable.
2. Defective feedback.

Remedy:

For 1. Check the feedback cable.
Lay the power cables separate from the feedback cable.
The cable shield must be connected to the drive controller.
(see project reference of the drive control).

For 2. Exchange motor.

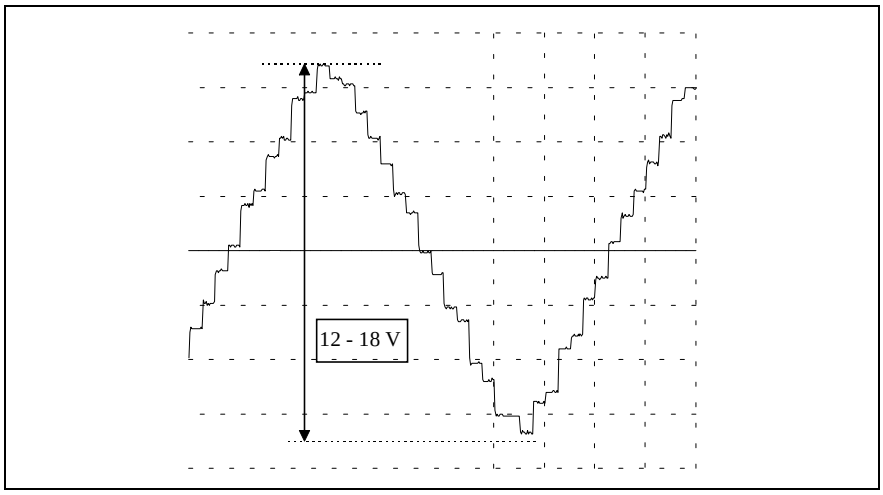

Figure 1-2: Methodically measured signal amplitude over AK: X31/1-2

F822 Attributes

SS Display :	F8/22
Diagnostic message :	F822 Motor Encoder Failure: Signal too small F822 Motor Encoder Failure: Signal too small
Error number :	822
Diagnostic message number :	F822
Error class :	Fatal

F860 Overcurrent: Short in Powerstage

Description:

The current in the power transistor bridge has exceeded twice the peak current of the drive. As a result, the drive will be immediately turned off. The drive has switched to a torque-free condition. An optional brake is immediately activated.

Cause:

1. Short circuit in the motor cable.
2. Defective power section of the drive controller.
3. The current regulator was incorrectly parameterized.

Remedy:

For 1. Check the motor cable for a short.

For 2. Exchange drive controller.

For 3. The current regulator parameters should not deviate from the default values of the feedback.

F860 Attributes

SS Display :	F8/60
Diagnostic message :	F860 Overcurrent : Short in Powerstage F860 Overcurrent : Short in Powerstage
Error number :	860
Diagnostic message number :	F860
Error class :	Fatal

F870 +24 V Error

Description:

The DKC requires a 24V control voltage. If the maximum allowable tolerance of +- 20% is exceeded, then the drive is immediately switched to torque free operation. An optional brake is activated.

Cause:

Disturbance or overload of the 24 V supply voltage. Measure control voltages.

Remedy:

Check wiring and/or replace power supply module.

F870 Attributes

SS Display :	F8/70
Diagnostic message :	F870 + 24 Volt Error
	F870 + 24 Volt Error
Error number :	870
Diagnostic message number :	F870
Error class :	Fatal

F873 Power Supply Driver Stage Fault

Description:

The voltage supply of the driver stage is monitored and if the voltage is too low then the drive is turned off.

Cause:

Voltage supply of the driver stage is too low

Remedy:

Exchange drive controller

F873 Attributes

SS Display :	F8/73
Diagnostic message :	F873 Power supply driver stage fault
	F873 Power supply driver stage fault
Error number :	873
Diagnostic message number :	F873
Error class :	Fatal

F878 Velocity Loop Error

Description:

The velocity loop monitor will appear when the following conditions occur simultaneously:

- The current command value is at the peak current limit
- The difference between the actual velocity and the command velocity is larger than 10% of the maximum motor velocity.
- The velocity control deviation does not become smaller over a time frame of 20ms.

Cause:

1. Motor cable is connected incorrectly.
2. Defective controller section of the drive.
3. Defective feedback.
4. Velocity loop paramaterized incorrectly.

Remedy:

For 1. Check motor cable connection.

For 2. Exchange drive controller.

For 3. Exchange motor.

For 4. Check velocity controller to see if it is within operational parameters.

F870 Attributes

SS Display :	F8/70
Diagnostic message :	F870 + 24 Volt Error F870 + 24 Volt Error
Error number :	870
Diagnostic message number :	F870
Error class :	Fatal

F879 Velocity Limit Value Exceeded (S-0-0092)

Description:

The actual velocity is monitored in torque regulation mode. This error is generated if the programmed velocity in the **"S-0-0091, bipolar velocity limit value"** parameter is exceeded by 1.25 times or a maximum of 100 Rpm.

Cause:

The load torque was smaller or larger than the torque command value for too long a time. This leads to an increase in the actual velocity up to the maximum possible motor velocity.

Remedy:

Check the primary control loop.

see also in functional description "Velocity Supervision in Torque Regulation"

F879 Attributes

SS Display :	F8/79
Diagnostic message :	F879 Velocity Limit Value Exceeded F879 Velocity Limit Value Exceeded
Error number :	879
Diagnostic message number :	F879
Error class :	Fatal

F895 4 kHz Signal Error

Description:

The 4kHz signal is synchronized with the software processing for creation of the resolver signal. This error message is created when synchronization occurs improperly.

Cause:

1. The synchronization of the resolver controller voltage is invalid in regards to the software.
2. The error can be produced through an electrical discharge.

Remedy:

For 1. Exchange drive controller and return for testing.

For 2. Power down and then on. If this in not successful; exchange drive controller.

F895 Attributes

SS Display :	F8/95
Diagnostic message :	F895 4kHz Signal Error
	F895 4kHz Signal Error
Error number :	895
Diagnostic message number :	F895
Error class :	Fatal

1.3 Warning Diagnostic Messages

E250 Heatsink Overtemperature Warning

Description:

The temperature of the heatsink in the drive controller has reached the maximum allowable temperature. Within a time frame of 30 seconds, the drive follows the command value input. Consequently, there exists the possibility to shut down the motor with the control so that it remains true to the process. (For example close the operation, leave the collision area, etc.) After 30 seconds, the parameter "**Best Possible Deceleration, P-0-0119"** set reaction appears during operation.

Cause:

1. Deficiency of the drive's internal blower.
2. Deficiency of the control cabinet's climate control.
3. Incorrect control cabinet dimensioning regarding the head ventilation.

Remedy:

For 1. If the blower fails exchange the drive controller.

For 2. Install climitization feature to the cabinet.

For 3. Check the dimensions of the control cabinet.

E250 Attributes

SS Display :	E2/50
Diagnostic message :	E250 Heatsink Overtemperature Warning
	E250 Heatsink Overtemperature Warning
Diagnostic message number :	E250
Warning class :	Non-fatal

E251 Motor Overtemperature Warning

Description:

The motor is too hot. Within in a time frame of 30 seconds, the drive follows the command value input. Consequently, there exists the possibility to shut down the motor with the control so that it remains true to the process. (For example close operation, leave the collision area, etc.). After 30 seconds, the parameter "**Best Possible Deceleration, P-0-0119"** set reaction will appear during operation.

Cause:

The motor became overloaded. The effective torque required of the motor was above the allowable standstill continuous torque for too long.

Remedy:

Check the installation of the motor. For systems which have been in use for a long time, check to see if the drive conditions have changed (in regards to pollution, friction, components which have been moved, etc).

E251 Attributes

SS Display :	E2/51
Diagnostic message :	E251 Motor Overtemperature Warning
	E251 Motor Overtemperature Warning
Diagnostic message number :	E251
Warning class :	Non-fatal

E252 Bleeder Overtemperature Warning

Description:

(see cause)

Cause:

The dampening resistance in the DKC is balanced through the energy that is reflected from the motor (about 90%). The bleeder overtemperature warning shows that an overload of the bleeder is expected with continued increasing feedback energy.

Remedy:

Reduce acceleration value or velocity. Check the drive installation.

E252 Attributes

SS Display :	E2/52
Diagnostic message :	E252 Bleeder Overtemperature warning
	E252 Bleeder Overtemperature warning
Diagnostic message number :	E252
Warning class :	Non-fatal

E253 Target Position Out of Range

Description:

If a position is entered which would exceed the target position, it will not be accepted. With “command controlled operation", the drive will not move.

Cause:

1. Position limit value monitor was activated
2. In the "Drive Internal Interpolation" operating mode, the **"S-0-0258, Target Position"** will be checked to determine if it’s in the possible travel range of the drive.
3. In the "Command Controlled Operation" operating mode, the target position of the selected process block will be checked to see if it lies within the travel range.

The possible travel range is defined through the two parameters **"S-0-0049 Position Limit Positive,"** and **"S-0-0050, Position Limit Negative."**

The E253 message will be generated if the target position lies outside of the travel range.

Remedy:

For 1. Deactivate the position limit monitor

For 2. Check the entered **S-0-0258, target position** and correct if necessary.

For 3. Check the target position of the process block. Add the relative path of travel to the actual position.
Additionally, check the position limit value.

E253 Attributes

SS Display :	E2/53
Diagnostic message :	E253 Target position out of range
	E253 Target position out of range
Diagnostic message number :	E253
Warning class :	Non-fatal

E254 Drive not Referenced

Description:

If "Absolute Positioning Commands" are selected while in "Command Controlled Operation" the control drive must be homed. If this is not the case, an absolute position cannot be reached. The drive rejects this positioning command and stops. The warning will be given.

Cause:

Absolute positioning command was selected without the drive being referenced.

Remedy:

1. Reference the drive
2. Select "Relative Positioning Command"

E254 Attributes

SS Display :	E2/54
Diagnostic message :	E254 Drive not Referenced
	E254 Drive not Referenced
Diagnostic message number :	E254
Warning class :	Non-fatal

E255 Feedrate-Override(S-0-0108) = 0

Description:

The transversing velocity can be changed while jogging, homing and while in positioning operation with the **"S-0-0108, Feedrate Override"** parameter. Since the drive controller cannot follow command values which do not move, the warning will be given if the value of this parameter is 0.

Cause:

1. Feedrate override is set at zero.
2. The "Feedrate Override Via Analog Output" field is activated and the voltage there is 0V.

Remedy:

For 1. Set the **S-0-0108** parameter to the correct value for the application.

For 2. Deactivate the field or establish a voltage larger than 0V.

E255 Attributes

SS Display :	E2/55
Diagnostic message :	E255 Feedrate-Override(S-0-0108) = 0
	E255 Feedrate-Override(S-0-0108) = 0
Diagnostic message number :	E255
Warning class :	Non-fatal

E256 Torque Limit Value = 0

Cause:

1. For protection against mechanical overload, the maximum torque can be limited by the **"S-0-0092, Bipolar Torque Limit parameter."** If the actual value of this parameter is equal to 0, the motor does not develop torque and does not follow the command value which has been entered.
2. Torque reduction is set through an analog channel and the established current amounts to 10 V.

Remedy:

For 1. Set the torque limit to a value larger than 0.

For 2. Establish the analog voltage so that it is smaller than 10 V.

E256 Attributes

SS Display :	E2/56
Diagnostic message :	E256 Torque Limit Value = 0
	E256 Torque Limit Value = 0
Diagnostic message number :	E256
Warning class :	Non-fatal

E257 Continuous Current Limiting Active

Description:

The drive controller sets the peak current available for 400ms. Thereafter, the continuous current limit becomes active and dynamically limits the peak current to the continuous current.

Cause:

More continuous torque was required than was available.

Remedy:

1. Check the drive installation.
2. Check the installation of the motor. For systems which have been in use for a long time, check to see if the drive conditions have changed (in regards to pollution, friction, components which have been moved, etc).

E257 Attributes

SS Display :	E2/57
Diagnostic message :	E257 Continuous current limiting active
	E257 Continuous current limiting active
Diagnostic message number :	E257
Warning class :	Non-fatal

E258 Selected Process Block is not Programmed

Cause:

A positioning block was selected for which there is no set target position, positioning velocity, etc.

Remedy:

Select another positioning block or enter the required data.

E258 Attributes

SS Display :	E2/58
Diagnostic message :	E258 Selected process block is not programmed
	E258 Selected process block is not programmed
Diagnostic message number :	E258
Warning class :	Non-fatal

E259 Command Velocity Limit Active

Description:

The velocity command value is limited to the value set in the **"S-0-0091, Bipolar Velocity Limit"** parameter when in the position and velocity control operating modes. This warning is given if the value in the **"S-0-0036, Velocity Command Value"** parameter reaches this limit.

Cause:

"S-0-0091, Bipolar Velocity Limit" parameter was set too low.

Remedy:

In normal operation, set the **"S-0-0091, Bipolar Velocity Limit"** parameter to a value 10% higher than the NC operation velocity.

E259 Attributes

SS Display :	E2/59
Diagnostic message :	E259 Command velocity limit active
	E259 Command velocity limit active
Diagnostic message number :	E259
Warning class :	Non-fatal

E264 Target Position not Representable

Cause:

When using the operating mode "command controlled operation, the target position of the selected additive process block will be verified to see if it lies within the represented range.

Remedy:

1. Check the target position and correct if necessary.
2. Select the position data display channel in modulo format.

E264 Attributes

SS Display :	E2/64
Diagnostic message :	E264 Target position not Representable
	E264 Target position not Representable
Diagnostic message number :	E264
Warning class :	Non-fatal

E825 Overvoltage Warning

Cause:

1. The mechanical system energy reflected via the motor was so large for a moment that it could not be completely converted to heat by the bleeder. As a result, the DC Bus voltage rose above the maximum allowable value. The motor is then switched to torque free operation. If the DC Bus voltage falls below the maximum allowable value, the controller will be turned on again.
2. DC Bus voltage is too high

Remedy:

For 1. Reduce the acceleration value and check the drive controller layout if necessary.
Install an auxiliary bleeder, if necessary.

For 2. Check the supply voltage, if necessary.

E825 Attributes

SS Display :	E8/25
Diagnostic message :	E825 Overvoltage Warning
	E825 Overvoltage Warning
Error number :	825
Diagnostic message number :	E825
Error class :	Non-fatal

E830 Position Limit Value Exceeded

Description:

A position command was given the drive which lies outside of the allowable travel area. The reaction of the drive regarding the travel area being exceeded would be selected as a warning.

Travel Area being exceeded as a warning:

The drive brakes with maximum torque until it is standing still and stays at that brake point in the activated state. If command values are given that lead into the allowable travel area, the drive will once again follow these commands and the warning will be disappear.

E830 Attributes

SS Display :	E8/30
Diagnostic message :	E830 Position Limit Value exceeded
	E830 Position Limit Value exceeded
Diagnostic message number :	E830
Error class :	fatal

E831 Position Limit Value Reached During Jogging

Description:

If the position limit value monitor is activated and the drive is “IN REFERENCE", then it will be positioned during movement in the jogging operation on the position limit value. If the drive is positioned on the position limit value or on the other side of the position limit value, then the drive stays still and signals „"position limit value reached during jogging."

Remedy:

1. Move the motor back within the allowable travel area with the jog function.
2. Turn off the position limit value monitor.

E831 Attributes

SS Display :	E8/31
Diagnostic message :	E831 Position Limit Value Reached During Jogging
	E831 Position Limit Value Reached During Jogging
Diagnostic message number :	831
Warning class :	Fatal

E844 Travel Limit Switch Activated

Description:

The drive was moved to one of the two travel limit switches. The reaction of the drive regarding the travel area being exceeded would be selected as a warning.

Exceeding the Travel Area as a Warning:

The drive brakes with maximum torque until it reaches a standstill and stays in an activated condition at this position. If command values are entered which lead into the allowable travel area, the drive will once again follow these commands and the warning will disappear.

E844 Attributes

SS Display :	E8/44
Diagnostic message :	E844 Travel Limit Switch activated
	E844 Travel Limit Switch activated
Diagnostic message number :	E844
Warning class :	Fatal

1.4 Command Diagnostic Message C...

C100 Communication Phase 3 Transition Check

Description:

The command **"S-0-0127, C1 Communication Phase 3 Transition Check"** is activated. The drive switches from parameter mode into operating mode.

C100 Attributes

SS Display :	C1/00
Diagnostic message :	C100 Communication phase 3 transition check
	C100 Communication phase 3 transition check
Diagnostic message number :	C100

C101 Invalid Communication Parameters (S-0-0021)

Cause:

Invalid parameters were found during the switch from parameter mode to operating mode.

Remedy:

Connect the control drive to a PC and activate DriveTop. Select the "Parameter List of Invalid Parameters" menu and set valid parameters.

C101 Attributes

SS Display :	C1/01
Diagnostic message :	C101 Invalid Communication Parameter (S-0-0021)
	C101 Invalid Communication Parameter (S-0-0021)S-0-0021
Diagnostic message number :	C101

C102 Limit Error Communication Parameter (S-0-0021)

Cause:

Parameters which exceed their limits were found during the switch from the parameter mode to operating mode.

Remedy:

Connect the control drive to a PC and activate DriveTop. Select the "Parameter List of Invalid Parameters" menu and set valid parameters.

C102 Attributes

SS Display :	C1/02
Diagnostic message :	C102 Limit Error Communication Parameter (S-0-0021)
	C102 Limit Error Communication Parameter (S-0-0021)
Diagnostic message number :	C102

C200 Communication Phase 4 Transition Check

Description:

The command C2 performs the last steps of the switch from parameter mode to operational mode. Thereby, numerous parameter checks will be conducted.

C200 Attributes

SS Display :	C2
Diagnostic message :	C200 Communication phase 4 transition check
	C200 Communication phase 4 transition check
Diagnostic message number :	C200

C201 Invalid Parameter Block (-> S-0-0022)

Cause:

Parameters which are necessary for the operation of the drive in operating mode are invalid.

Remedy:

Connect the control drive to a PC and activate DriveTop. Select the "Parameter List of Invalid Parameters" menu and set valid parameters.

C201 Attributes

SS Display :	C2/01
Diagnostic message :	C201 Invalid Parameter (-> S-0-0022)
	C201 Invalid Parameter (-> S-0-0022)
Diagnostic message number :	C201

C202 Limit Error Parameter (-> S-0-0022)

Cause:

Parameters which are necessary for the operation of the drive in operating mode are outside of its minimum or maximum input values.

Remedy:

Connect the control drive to a PC and activate DriveTop. Select the "Parameter List of Invalid Parameters" menu and set valid parameters.

C202 Attributes

SS Display :	C2/02
Diagnostic message :	C202 Limit Error Parameter (-> S-0-0022)
	C202 Limit Error Parameter (-> S-0-0022)
Diagnostic message number :	C202

C203 Parameter Calculation Error (-> S-0-0022)

Cause:

Parameters which are required for operation of the drive in the operation mode, found errors in the conversion that do not permit an orderly operation.

Remedy:

Connect the control drive to a PC and activate DriveTop. Select the "Parameter List of Invalid Parameters" menu and set valid parameters.

C203 Attributes

SS Display :	C2/03
Diagnostic message :	C203 Parameter Calculation Error (->S-0-0022)
	C203 Parameter Calculation Error (-> S-0-0022)
Diagnostic message number :	C203

C207 Loading Error LCA

Cause:

Defective drive.

Remedy:

Power down and then on again. If this in not successfull, exchange drive.

C207 Attributes

SS Display :	C2/07
Diagnostic message :	C207 Loading Error LCA
	C207 Loading Error LCA
Diagnostic message number :	C207

C208 Invalid SSI Parameter (-> S-0-0022)

Description:

When the motors are first distributed, the parameter for absolute control emulation is purposely invalid to ensure that the "Set Absolute Measurement Emulator Command" will be executed after a motor is exchanged.

Cause:

The SSI emulation was selected. The parameters required for emulation are invalid.

Remedy:

Connect the control drive to a PC and activate DriveTop.

"Actual Position Output" menu with controller emulation type "Absolute Controller Emulation (SSI)":

- Describe "Homing Position/Offset"
- Select "Absolute Control Directional Counter"

C208 Attributes

SS Display :	C2/08
Diagnostic message :	C208 Invalid SSI Parameter (S-0-0022)
	C208 Invalid SSI Parameter (S-0-0022)
Diagnostic message number :	C208

C211 Invalid Feedback Data (-> S-0-0022)

Description:

Invalid data was found while processing the parameters stored in the motor feedback.

Causes:

1. Defective motor feedback cable
2. Defective motor feedback

Remedy:

For 1. Check the motor feedback cable

For 2. Exchange the motor

C211 Attributes

SS Display :	C2/11
Diagnostic message :	C211 Invalid feedback data (-> S-0-0022)
	C211 Invalid feedback data (-> S-0-0022)
Diagnostic message number :	C211

C212 Invalid Amplifier Data (-> S-0-0022)

Description:

During the installation of the drive, data from the drive controller will be processed for drive identification. If invalid data is detected, this error message will be displayed.

Cause:

Defective hardware in the drive controller

Remedy:

Exchange drive controller.

C212 Attributes

SS Display :	C2/12
Diagnostic message :	C212 Invalid amplifier data (-> S-0-0022)
	C212 Invalid amplifier data (-> S-0-0022)
Diagnostic message number :	C212

C213 Position Data Scaling Error

Cause:

The display format of the position data can be set with the help of the scaling parameter. The internal drive format of the position data is dependent on the applied feedback and the controller resolution. The factor for the conversion of the position data from the internal drive format into the display format or the reverse conversion is outside of the workable area because either:

- Rotary motor and linear positional scaling are not representable or
- the average factor for conversion of the position data from the display format into the internal format (or reverse process) is not representable.

Remedy:

Connect the drive with a PC and start DriveTop. In the dialog box „Scaling/Mechanical system" select a scaling setting.

Should another scaling installation other than one from DriveTop be used, then the following parameters must be checked.

- **S-0-0076, Position Data Scaling Type**
- **S-0-0077, Linear Position Data Scaling Factor**
- **S-0-0078, Linear Position Data Scaling Exponent**
- **S-0-0121, Input Revolutions of Load Gear**
- **S-0-0122, Output Revolutions of Load Gear**
- **S-0-0123, Feed Constant**

C213 Attributes

SS Display :	C2/13
Diagnostic message :	C213 Position data scaling error
	C213 Position data scaling error
Diagnostic message number :	C213

C214 Velocity Data Scaling Error

Cause:

The display format of the velocity data can be set with the help of the scaling parameter. The internal drive format of the velocity data is dependent on the applied feedback and the controller resolution. The factor for the conversion of the velocity data from the internal drive format into the display format (or the reverse process) is outside of the workable area.

Remedy:

Connect the drive with a PC and start DriveTop. In the dialog box „Scaling/Mechanical system" select a scaling setting.

Should another scaling installation other than one from DriveTop be used, then the following parameters must be checked.

- **S-0-0044, Velocity Data Scaling Type**
- **S-0-0045, Velocity Data Scaling Factor**
- **S-0-0046, Velocity Data Scaling Exponent**
- **S-0-0121, Input Revolutions of Load Gear**
- **S-0-0122, Output Revolutions of Load Gear**
- **S-0-0123, Feed Constant**

C214 Attributes

SS Display :	C2/14
Diagnostic message :	C214 Velocity data scaling error
	C214 Velocity data scaling error
Diagnostic message number :	C214

C215 Acceleration Data Scaling Error

Cause:

The display format of the acceleration data can be set with the help of the scaling parameter. The internal drive format of the acceleration data is dependent on the applied feedback and the controller resolution. The factor for the conversion of the acceleration data from the internal drive format into the display format (or the reverse process) is outside of the workable area.

Remedy:

Connect the drive with a PC and start DriveTop. In the dialog box „Scaling/Mechanical system" select a scaling setting.

Should another scaling installation other than one from DriveTop be used, then the following parameters must be checked.

- **S-0-0160, Acceleration Data Scaling Type**
- **S-0-0161, Acceleration Data Scaling Factor**
- **S-0-0162, Acceleration Data Scaling Exponent**
- **S-0-0121, Input Revolutions of Load Gear**

- **S-0-0122, Output Revolutions of Load Gear**
- **S-0-0123, Feed Constant**

C215 Attributes

SS Display :	C2/15
Diagnostic message :	C215 Acceleration data scaling error
	C215 Acceleration data scaling error
Diagnostic message number :	C215

C216 Torque Data Scaling Error

Cause:

The display format of the torque data can be set with the help of the scaling parameter. The factor for the conversion of the torque data from the internal drive format into the display format (or the reverse process) is outside of the workable area.

Remedy:

Connect the drive with a PC and start DriveTop. Select a scaling setting in the "Scaling/Mechanical system" dialog box.

Should a scaling installation other than one from DriveTop be used, then the following parameters must be checked.

- **S-0-0086, Torque/Force Data Scaling Type**
- **S-0-0093, Torque/Force Data Scaling Factor**
- **S-0-0094, Torque/Force Data Scaling Exponent**

C216 Attributes

SS Display :	C2/16
Diagnostic message :	C216 Torque/Force data scaling error
	C216 Torque/Force data scaling error
Diagnostic message number :	C216

C217 Motor Feedback Data Reading Error

Cause:

All MKD and MDD motors contain feedback data memory. From this, the settings for the controller will be read. By processing these values, an error is detected.

Remedy:

Check the feedback cable

Exchange the motor

C217 Attributes

SS Display :	C2/17
Diagnostic message :	C217 Motor feedback data reading error
	C217 Motor feedback data reading error
Diagnostic message number :	C217

C220 Motor Feedback Initializing Error

Description:

A number of tests are performed when the motor feedback is initialized. An error was detected while doing this. This error can be:

1. Disturbance in the communication with the controller
2. Invalid offset between the high and low dissipating path
3. Error in the micro-controller of the measuring system

Cause:

1. Defective motor feedback cable
2. Defective motor feedback
3. Defective measurement system interface

Remedy:

For 1. Check the motor feedback cable

For 2. Exchange the motor

For 3. Exchange the measuring system interface (module)

C220 Attributes

SS Display :	C2/20
Diagnostic message :	C220 Mot.Feedback Initializing Error
	C220 Mot.Feedback Initializing Error
Diagnostic message number :	C220

C227 Modulo Range Error

Cause:

The given modulo value is larger than half of the represented positioning area of the drive. (Half of the represented positioning area for the DKC01 is 2048 rotations.)

Remedy:

Select a smaller modulo value.

see also functional description: "Border requirements for modulo processing"

C227 Attributes

SS Display :	C2/27
Diagnostic message :	C227 Modulo range error
	C227 Modulo range error
Diagnostic message number :	C227

C300 Command: Set Emulation - Absolute Value

Description:

The actual position of the motor can be given by means of an SSI emulation. The zero point of a given position can be fixed with the "C3 Command set emulation-absolute value" command.

C300 Attributes

SS Display :	C3
Diagnostic message :	C300 Command set emulation-absolute value
	C300 Command set emulation-absolute value
Diagnostic message number :	C300

C300 Set Absolute Measuring

Description:

The command **"P-0-0012, Set Absolute Measurement** was activated via the control system.

C300 Attributes

SS Display :	C3
Diagnostic message :	C300 Set absolute measuring
	C300 Set absolute measuring
Diagnostic message number :	C300

C301 Setting Absolute Measuring not Allowed, Drive Enabled

Cause:

The command "C300 Command Setting of Absolute Measurement Emulator" was started with the given drive enable.

Remedy:

End the command and deactivate the control enable.

C301 Attributes

SS Display :	C3/01
Diagnostic message :	C301 Setting Absolute Measuring not Allowed, Drive Enabled
	C301 Setting Absolute Measuring not Allowed, Drive Enabled
Diagnostic message number :	C301

C302 Absolute Measuring System not Installed

Description:

The command "**P-0-0012, command set absolute measurement"** would be started without an existing absolute measurement system.

The command can not be processed because there is no existing absolute measurement system.

Cause:

1. The command was falsely activated.
2. The connected motor does not contain an absolute encoder. (Option)

Remedy:

For 1. Stop the command process.

For 2. Equip the motor or external measurement system with an absolute encoder function.

C302 Attributes

SS Display :	C3/02
Diagnostic message :	C302 Absolute Measuring System Not Installed
	C302 Absolute Measuring System Not Installed
Diagnostic message number :	C302

C400 Switch from Operational to Parameter Mode

Description:

The command for transition is in parameter mode. While editing the parameters that can be edited only in parameter mode, this command must be processed.

C400 Attributes

SS Display :	C4
Diagnostic message :	C400 Command: Switch to parameter mode
	C400 Command: Switch to parameter mode
Diagnostic message number :	C400

C401 Active Drive, Transition is not Permissable

Cause:

The command C400 “switch from operational to parameter mode" would be started without the control enable being activated.

Remedy:

End the command and turn off the drive enable, then the command can be started from the beginning.

C401 Attributes

SS Display :	C4/01
Diagnostic message :	C401 Drive active, Transition is not Permissable
	C401 Drive active, Transition is not Permissable
Diagnostic message number :	C401

C500 Reset Class 1 Diagnostic

Description:

The command for erasing errors, **"S-0-0099, Reset Class 1 Diagnostics"** was activated via the connected control system. All internal drive errors are erased. However, the errors must have been previously corrected.

C500 Attributes

SS Display :	C5
Diagnostic message :	C500 Reset class 1 diagnostic (error reset)
	C500 Reset class 1 diagnostic (error reset)
Diagnostic message number :	C500

C600 Drive Controlled Homing Procedure

Description:

The command **"S-0-0148, Drive Controlled Homing Procedure"** was activated via the connected control system. The control drive automatically performs the internal drive homing procedure. Give the drive a start command to do this. Prior to this the drive must be enabled and in motion.

C600 Attributes

SS Display :	C6
Diagnostic message :	C600 Drive controlled homing procedure
	C600 Drive controlled homing procedure
Diagnostic message number :	C600

C601 Homing Procedure not Possible without Drive Enable

Cause:

The command would be started without drive enable being turned on.

Remedy:

1. Enable Drive
2. Restart the command.

C601 Attributes

SS Display :	C6/01
Diagnostic message :	C601 Homing Procedure not Possible without Drive Enable
	C601 Homing Procedure not Possible without Drive Enable
Diagnostic message number :	C601

C602 Zero Switch to Home Reference Error

Cause:

During the drive controlled homing procedure, an ambiguous position for the home reference of the feedback and the switch flank of the home switch was determined.

Remedy:

The cam of the home switch must be shifted in such a manner such that an accurate homing procedure is possible.

- Read the contents of parameter **"P-0-0020, Shifting of the Homing Cam..."**
- Mechanically shift the homing cam by the amount in the parameter.
- Re-perform the drive controlled homing procedure.

C602 Attributes

SS Display :	C6/02
Diagnostic message :	C602 Zero Switch to Home Reference Error
	C602 Zero Switch to Home Reference Error
Diagnostic message number :	C602

C603 Homing Procedure not Possible in this Operating Mode

Cause:

During operation of the drive in torque control or velocity control, the homing command can not be processed.

Remedy:

Clear the homing command.

Set another operating mode.

C603 Attributes

SS Display :	C6/03
Diagnostic message :	C603 Homing Procedure not Possible in this Operating Mode
	C603 Homing Procedure not Possible in this Operating Mode
Diagnostic message number :	C603

C604 Homing Procedure not Possible with Absolute Measurement Control

Cause:

If the homing command is called up by the absolute value encoder without previously processing the command **"P-0-0012, setting the absolute measurement,"** the reference command will be discontinued with this error.

If the encoder was able to be homed through the **"set absolute measurement"**, a position on the home value will be erased with the homing command.

Remedy:

Home the absolute encoder with the command **"Set Absolute Measurement"**

C604 Attributes

SS Display :	C6/04
Diagnostic message :	C604 Homing Procedure not Possible with Absolute Measurement Control
	C604 Homing Procedure not Possible with Absolute Measurement Control
Diagnostic message number :	C604

C700 Basic Load

Description:

When using MDD and MKD motors, the technical control adaptation of the mechanical system on the digital drive relates to the activation of the stored velocity control parameter in the motor feedback. The drive controller signals with the message C7 that the command C7 basic load was activated with the command **"S-0-0262, command basic load."**

C700 Attributes

SS Display :	C7/00
Diagnostic message :	C700 Basic load
	C700 Basic load
Diagnostic message number :	C700

C800 Load Basic Parameters

Description:

By pressing the S1 button on the controller with display PL or by starting the "Load Basic Parameters Command," all parameters will be erased and set with the default value.

The process blocks are lost also.

C800 Attributes

SS Display :	C8/00
Diagnostic message :	C800 Load Basic Parameters
	C800 Load Basic Parameters
Diagnostic message number :	C800

1.5 State diagnostic message

A002 Communication Phase 2

Parameter Mode

A002 Attributes

Diagnostic message : A002 Communication Phase 2
A002 Communication Phase 2
Diagnostic message number : A002

A003 Communication Phase 3

Parameter Mode

A003 Attributes

Diagnostic message : A003 Communication Phase 3
A003 Communication Phase 3
Diagnostic message number : A003

A010 Drive Halt

Description:

With the set control, the function drive halt would be activated. The drive-stop-function serves to stop the motor with a defined acceleration and defined jerk.

The acceleration or the jerk limit of the inputted position block functions during "linked block operation."

The acceleration limit and bipolar jerk value function during jogging operation and stepper motor interface.

The drive will be brought to stand still by the velocity command zero switch during torque regulation and velocity regulation.

A010 Attributes

SS Display AH
Diagnostic message : A010 Drive Halt
A010 Drive Halt
Diagnostic message number : A010

A012 Control and Power Sections Ready for Operation

Description:

The drive is supplied with control voltage and the power is switched on. The drive is ready for power delivery.

A012 Attributes

SS Display	Ab
Diagnostic message :	A012 Control and Power Sections Ready for operation
	A012 Control and Power Sections Ready for Operation
Diagnostic message number :	A012

A013 Ready for Power

Description:

The drive is supplied with a control voltage; there are no errors in the control drive. The drive is ready to be turned on.

A013 Attributes

SS Display	bb
Diagnostic message :	A013 Ready for Power
	A013 Ready for Power
Diagnostic message number :	A013

A100 Drive in Torque Mode

Description:

The drive is functioning in torque mode. The drive follows the given torque command value received over the analog channels E1 and E2.

A100 Attributes

SS Display :	AF
Diagnostic message :	A100 Drive in torque mode
	A100 Drive in torque mode
Diagnostic message number :	A100

A101 Drive in Velocity Mode

Description:

The drive is functioning in velocity mode. The drive follows the given velocity command value received over the analog channels E1 and E2.

A101 Attributes

SS Display :	AF
Diagnostic message :	A101 Drive in velocity mode
	A101 Drive in velocity mode
Diagnostic message number :	A101

A203 Position Control/Stepper Drive Interface

Description:

The drive is functioning in position control with Stepper interface. The device follows the position command which will be developed out of the stepper motor signals.

A203 Attributes

SS Display :	AF
Diagnostic message :	A203 Position Control/Stepper Drive Interface
	A203 Position Control/Stepper Drive Interface
Diagnostic message number :	A203

A204 Position Regulation without Lag/Stepper Drive Interface

Description:

The drive is functioning in position regulation without lag/Stepper Drive interface. The device follows the position command which will be developed out of the stepper motor signals.

A204 Attributes

SS Display :	AF
Diagnostic message :	A204 Position Regulation without Lag/Stepper Drive Interface
	A204 Position Regulation without Lag/Stepper Drive Interface
Diagnostic message number :	A204

A206 Position Regulation/Positioning Drive

Description:

The drive is functioning in position regulation/Positioning drive. The drive is positioned on the selected target position with the given acceleration, velocity and jerk.

A206 Attributes

SS Display :	AF
Diagnostic message :	A206 Position Regulation/Positioning Drive
	A206 Position Regulation/Positioning Drive
Diagnostic message number :	A206

A207 Position Regulation without Lag/Positioning Interface

Description:

The drive is functioning in position regulation without lag/Positioning Interface. The drive is positioned on the selected target position with the given acceleration, velocity and jerk.

A207 Attributes

SS Display :	AF
Diagnostic message :	A207 Position Mode /POSITION lagless positioning
	A207 Position Mode /POSITION lagless positioning
Diagnostic message number :	A207

AF Drive Enable

The drive enable signal has been applied. The drive will follow the velocity command (normal operation)

JF Jogging in the Positive Direction

The drive moves with a jogging velocity in the positive direction. The motor is turning clockwise, when viewing the motor shaft.

JB Jogging in the Negative Direction

The drive moves with a jogging velocity in the negative direction. The motor is turning counter clockwise, when viewing the motor shaft.

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